Observations

ON

INJURIES OF THE OPTIC NERVE.*

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As a cause of blindness, optic atrophy ranks second to ophthalmia neonatorum. In the reports of the Birmingham Institute for the Blind, optic atrophy is given as the cause of blindness in 14 per cent. of the cases, and in over a fourth of this number there was a history of traumatism. During the last year 42 cases of primary optic atrophy were treated at the Birmingham Eye Hospital, and of these 10 were ascribed to injury; 25 per cent. seems, therefore, to represent the average percentage of traumatic cases, but, owing to the accelerated methods of locomotion, this percentage is likely to be increased in the future.

For the purposes of this paper it will be convenient to discuss injuries of the optic nerve under the headings "Direct" and "Indirect."

I. DIRECT INJURIES OF THE OPTIC NERVE.

In civil practice these injuries are comparatively rare, but in military practice they are more common. During the Boer war several cases of bullet wounds of the optic nerve were recorded, but it is more than likely that most of the cases of bilateral blindness ascribed to bullet wounds of the optic nerve were due to indirect rather than direct injury of the nerve. Apart from immediate and permanent loss of vision, wounds or rupture of the optic nerve are generally associated with haemorrhage into the orbit, proptosis and impairment of ocular movements either from injury to the oculo-motor nerves or from the mechanical interference of the effused blood. In many instances there is impairment of the sense of smell from injury to the olfactory nerves. It is possible, however, for these associated symptoms to be absent almost entirely. I remember a butcher who came to the Eye Hospital some years ago complaining of having suddenly lost the sight of one eye as the result of his knife having accidentally penetrated into the inner angle of the orbit. Beyond some haemorrhage into the conjunctiva in that region there was little to note, and though the fundus looked normal at the time, he was absolutely blind in that eye, and he developed signs of atrophy of the optic disc in the course of a few weeks. We therefore concluded that the nerve had been divided by the knife.

As a contrast to this is the case of a boy, once shown before this society, who fell on an open pocket knife, which penetrated the lower lid and entered the orbit, and apparently seriously damaged every nerve in the orbit, producing complete ophthalmoplegia and loss of vision, followed by enophthalmos, permanent minus tension and keratitis neuroparalytica. In this case there was an extensive haemorrhage into the orbit, and some in the eye itself, at the time of the accident.

In most cases the injured part of the nerve lies behind the point of entry of the central retinal vessels, and consequently there is no disturbance of the intraocular circulation. If the nerve has been divided in front of the point of entrance of the central retinal vessels, the ophthalmoscopic picture will be like that of embolism of the central artery—namely, marked retinal oedema at the posterior pole, without, however, any very definite cherry-red spot at the macula. The retina to a great extent regains its vascularity by degrees, but, of course, this is not accompanied by restoration of retinal function.

In obstetric practice the eye has, in rare instances, been scooped out by the blade of the forceps getting between the eye and the roof of the orbit, the optic nerve being torn in its orbital course or at the optic foramen. The most remarkable obstetric accident recorded is that in which the obstetrician mistook an orbit in a face presentation for the anus in a breech presentation, and gouged out the eyeball with his finger!. It is interesting to note and important to remember that, short of avulsion, the eye may be extruded between the lids, during labour, without doing any serious harm to the optic nerve. Cases of this kind, in which the eye has been replaced and the sight retained, have been recorded by Beaumont, Baldwin, and others. It is, therefore, absolutely unjustifiable to excise an extruded eye without making an attempt to reduce it. The optic nerve may be directly injured during operations on the orbital contents or on the nose. In optico-ciliary neurectomy a piece of the optic nerve is excised. It appears that simple section of the optic nerve and central vessels does not cause retinal oedema, but this latter effect follows section of the ciliary arteries only.

Formerly the optic nerve sheath used to be tapped in cases of optic neuritis. I have no experience of the operation, but though it apparently did not arrest the progress of the neuritis, it presumably did not aggravate the disease. I have, however, seen a cyst of the optic nerve sheath removed after resection of the orbital wall by Krönlein's method, and the patient has retained practically full vision and field.

Intranasal operations on the ethmoidal and sphenoidal sinuses must be apt to cause injury to the optic nerve, either by direct action of the instruments or by splintering of the thin bony partitions which bound the optic foramen and sulcus. Whether such operative interference is often followed by interference with visual function I do not know; but were this at all common I think we should become aware of it, as in Birmingham, at any rate, ophthalmologists and rhinologists are often associated in the treatment of diseases of the accessory sinuses.

II. INDIRECT INJURIES OF THE OPTIC NERVE.

Indirect are, in my experience, much more common than direct injuries.

The injury may result from the application of force to the eye itself, from blows on the orbital margins, from damage to the orbital contents by projectiles, or they may result from falls or blows on the head, compression of the skull, or falls on the lower end of the spinal column.

(*a*) *Blows on the Eye.*

Blows by blunt instruments—that is, by the point of an umbrella, garden stake, stone, etc.—are sometimes followed by atrophy of the optic nerve owing to partial or complete rupture of the nerve at the scleral foramen. In these cases it is usual to find haemorrhage in Cloquet's canal and in the retina and choroid. Cases of this kind have been recorded by Lang, Caspar, and Aschmann. The last-named was able to verify the diagnosis, histologically. Lang's case retained vision of $\frac{3}{60}$ and the greater part of the lower half of the visual field.

I saw a case of this kind with Dr. Rowlands, of Bromsgrove, some three years ago. A boy aged 9 years had been struck by a stone which had bruised the left eyebrow at the junction of outer and middle third, and there was an abrasion of the cornea and sclerotic in the upper and outer segment of the globe. The anterior chamber was full of blood. When the latter became absorbed it was found that there was still haemorrhage in the vitreous, and that the iris was ruptured and the lens dislocated. The optic papilla was hazy and surrounded by a halo of retinal infiltration. The field was defective, chiefly in the upper and inner quadrants. Vision was reduced to $\frac{1}{60}$. When I examined him again, three years later, I found the disc was horizontally oval, with a crescentic atrophic area, having a collection of pigment at one horn, below and out. The vision was $\frac{6}{60}$ with correction, but the field had contracted considerably.

(*b*) *Blows on the Orbital Margins.*

Blows on the orbital margin are a prolific source of indirect injuries of the optic nerve. Cyclists are particularly liable to such injuries. A cyclist when thrown from his machine, through skidding or otherwise, is very liable to strike some part of the orbital margins. If he falls over the handlebars the part injured will probably be the superior border, but if he falls laterally he generally strikes the external angular process against the kerbstone or some such object. According to the pace of the rider and the force of the fall, this may or may not be followed by loss of consciousness and other signs of concussion of the brain, and it may or may not be associated with haemorrhage from the nostril or nostrils, sickness, and vomiting. In many cases momentary dizziness and a black eye are the only symptoms beyond an immediate failure of sight on the injured side. This failure of vision may amount to complete blindness in the affected eye, but in many cases it is a partial though permanent blindness—that is, loss of part of the field of vision, with reduction of

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central vision. The part of the visual field lost seems to me to bear a relation to the direction of the force applied to the orbital margins. In the case of a fall on the external angular process the force is applied laterally to the lateral half of the field, and almost always the temporal half becomes lost. When the force is applied vertically, the vertical half of the field is lost—the upper half when force is applied from above downwards, and the lower half when the force is applied from below upwards—though this is not so constant as the loss of the temporal field in falls on the external angular process.

Whether vision be partially or completely lost in these cases, ophthalmoscopic changes are conspicuous by their absence at the time of the injury. In the course of three or four weeks, however, atrophic changes become visible in the nerve head, and after some considerable time a slight, though appreciable, diminution in the size of the retinal vessels becomes apparent.

Central vision often improves considerably during the first few months after the accident, but the restriction of the visual field undergoes no appreciable change. Colour vision is often somewhat impaired, and central scotoma for colours has been noted.

As to the pathogenesis of this form of nerve injury, a good deal has been written. I am, however, inclined to doubt Oettingen's statement that "there are few cases in which permanent blindness should, with our present knowledge, be attributed to concussion of the retina or the optic nerve." Various authorities have ascribed the injury of the nerve in these cases to:

1. Fracture of the skull extending through the optic foramen.
2. Laceration of the nerve by a detached and displaced anterior clinoid process or other spicule of bone.
3. Haemorrhage into the sheath or substance of the optic nerve.

It is hardly conceivable that anything more than a fissure fracture of the orbital roof can occur in the less severe cycling accidents, and fracture without considerable displacement is not likely to produce immediate, complete, or partial destruction of the optic nerve.

Laceration by detached bone would appear equally unlikely to give rise to such definite results as follow falls on the orbital margins. Haemorrhage into the sheath or nerve substance would probably involve the whole nerve, or, at any rate, would not be at all likely to be confined in its effects to one-half of the nerve, as it would have to be to produce hemianopia. One is therefore forced to regard the lesion as one of contusion of the optic nerve, at the foramen, by *contrecoup*—that is, the nerve is damaged by being driven against the inner boundary of the foramen in falls on the external angular process and against the lower and upper boundaries in blows or falls from above downwards and from below upwards respectively. In the case of falls on the external angular process, the external part of the nerve is also largely protected from the severity of the force by the ophthalmic artery, which lies on its outer side.

(c) *Gunshot Wounds of the Orbit and Indirect Injuries of the Optic Nerve.*

In civil practice one's experience of these cases is confined to a few accidental and suicidal injuries. Cohn's studies of such injuries in the Franco-German war, and Nettleship's paper on blindness from gunshot injuries—chiefly in the last Boer war—have thrown a good deal of light on the subject. In the case of blindness caused by projectiles of high velocity it is usual to find that there is free bleeding into the vitreous, with choroido-retinal inflammatory exudation, without, however, any softening or shrinking of the globe, or any sign of rupture of the sclerotic.

In cases due to projectiles of lower velocity—for example, revolver and air-gun projectiles—these intraocular changes are either absent altogether or are present to a limited extent only when the projectile has passed rather close to the globe.

In cases of injuries from rifle bullets and shells the blindness and intraocular lesions occur without the projectile having touched the eye or optic nerve, and even without its traversing the orbit.

In these cases Nettleship remarks:

> The almost total blindness is not explained by the choroido-retinal changes, and we must assume that the optic nerve is destroyed either by immediate haemorrhage into its substance, by vibration injury, or by subsequent inflammation, extending from the damaged region of the choroid. As no examination of sight was made until several weeks after the injury, the point cannot be decided.

I think, however, that we are justified in ascribing the nerve and intraocular lesions to vibration effects, which Nettleship describes as follows:

> The indirect lesions are, it seems, to be explained by assuming that—at any rate, in the case of soft tissues, which during life are almost fluid—the force of the projectile is partly changed into vibrations of the tissue particles, which vibrations radiate in lines from the long axis of the bullet track so forcibly that they act as secondary missiles.
>
> These vibrations may pass harmlessly through a somewhat dense and resisting tissue, such as the sclerotic, and even through bone, and yet cause destructive changes in the soft, delicate structures of the retina, optic nerve, and choroid.

(d) *Falls or Blows on the Head.*

Optic atrophy may follow compression of the skull and distortion of the orbit of a child by the forceps in instrumental delivery. In these cases the nerve becomes compressed by displaced bone, or the atrophy follows upon haemorrhage into the optic nerve sheath or substance. Possibly a similar result may follow pressure of the head against the sacral promontory during natural but prolonged and difficult labour. Falls on the head (vertex) may be followed by atrophy of the optic nerve for the same reasons that were put forward to explain optic atrophy following blows on the orbital margins. It is evident that it is not essential to assume a fracture of the optic foramen or foramina in these cases, though such is more likely than in cases of blows on the orbital margins. It should be noted, too, that most extensive fractures of the skull and facial bones may occur without affecting the optic nerves and eyes in the least degree.

Antero-posterior blows, falls, or compression of the skull may likewise be followed by atrophy of the optic nerve. In many cases of skull injuries the atrophy is post-neuritic, and in some cases we find a persistent optic neuritis, or at any rate an apparent optic neuritis, which does not progress to atrophy.

It is evident that we have much to learn with regard to these injuries of the optic nerve, and our knowledge can only be advanced by co-operation between general and ophthalmic surgeons and more careful and frequent *post-mortem* examinations of skull injuries. By these means and careful clinical observations, we may hope some day to establish a theory adequate to explain the varied and somewhat contradictory conditions frequently observed.

ON THE VALUE OF SURFACE SIGNS IN THE DIAGNOSIS OF DEEP-SEATED DISEASE.

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EXAMINATION of several typical cases of gastric ulcer elicited the well-recognized tenderness over the epigastrium. Various methods were used, such as pressure, pinching the skin, etc., but the most satisfactory results were obtained by gently drawing a pencil over the area examined, when a definite localized hyperaesthetic spot was found without unduly exciting the patients; when hyperaesthesia is found on the abdomen, a spot also exists over the spinal column in the region of the dorsal branch of the cutaneous nerve affected (Sahli). All the cases examined exhibited the abdominal tenderness, and the more recent ones were confirmed by the dorsal reaction.

Similar observations were made in young men of the gastro-neurasthenic type, and, while tapping and pinching would at times elicit a response, gentle stroking of the epigastrium, controlled by stroking the spine, never gave evidence of hyperalgesia. During these observations a young man about 24 years of age presented himself for treatment with dyspeptic symptoms. He had had many gastric sedatives without relief, but his gastric symptoms were relieved by bromides, in spite of the irritating effect of the salt on the gastric mucosa.

The two following cases suggest this sign to be of value in the diagnosis of duodenal ulcers. A typical case of

duodenal ulcer was to be operated upon; he had a definite hyperaesthetic spot just above the umbilicus, and at the operation an ulcer was discovered. The other was the case of a man, about 45 years of age, who suffered from anaemia, indigestion, and melaena. A spot of tenderness was found in a similar position. This case was, however, not confirmed; the man is in good health at present, four years after his illness, thus excluding malignant disease. An attempt to obtain this reaction in malignant disease and chronic (tuberculous) ulceration of the gut was negative.

The above observations have led to the conclusions that this reaction is only present in acute ulceration, and that it is found at or near the middle line both ventrally and dorsally—that is, at the cutaneous nerve terminals corresponding to that segment of the cord which supplies the sympathetic nerve or nerves to the viscus involved. In support of this statement it may be said that in the duodenal cases the tenderness was found near the umbilicus considerably lower than the gastric tenderness, whereas it is possible for a gastric ulcer to be anatomically lower than a duodenal one, but as the stomach is embryologically a vertical organ, the duodenum receives its nerve supply from a lower segment of the cord than the stomach, whatever its eventual anatomical relationship may become.

No doubt in acute ulceration the nerve terminals are exposed and irritated, producing a reflex irritability of the cutaneous representative. This probably explains the absence of tenderness in malignant ulcers in which there are no terminals to be irritated by the alimentary contents; in necrotic tuberculous tissue also there would probably be no active terminals.

With regard to the clinical value of the intensity of the pain only one positive statement can be made, and that is that a sudden diminution in the pain is of grave import. Comparing the mucosa with the skin, one might imagine that a simple erosion just exposing the terminals would be more painful than a deeper ulceration as in the case of burns.

Having made the above observations on the neuro-cutaneous reaction, an attempt was made to obtain a neuromuscular reaction over deep-seated organs.

Beevor's sign in nervous disease is well recognized; still further, it has recently been stated that the rectus reflex is absent in typhoid fever. No doubt the rectus reflex is protective, and it seems rational to conclude that its so-called absence in typhoid is, in reality, its continuous presence as a protection to the inflamed viscera beneath. If, then, a localized viscus be inflamed, one would expect to find the rectus, or, more broadly, the abdominal reflex, absent only in this area. The following cases, which were under observation at the same time, support this view:

(*a*) A girl, aged 22 years, had a slight temperature, diarrhoea, and blood in the motions; her reflex was present.
(*b*) A boy, aged 12 years, had fever, tympanites, etc.; his reflex was absent.
(*c*) A lad, aged 17 years, had somewhat obscure colicky symptoms; his reflex was present everywhere except in the appendicular region.
(*a*) recovered in a few days, (*b*) ran a typically typhoid course, and (*c*) was operated upon and a diseased appendix removed.

The abdominal reflex is often difficult to obtain in fat and pendulous abdomens, but is especially marked in children, where it is of great value, for example, in appendicitis, which is so frequently overlooked and diagnosed as colic.

In attempting to obtain this reaction recently in a case of appendicitis no reaction was visible, but a twitch of the umbilicus was seen when the abdomen was stroked everywhere except in the appendix region.

Another neuro-muscular reaction is the so-called myotatic irritability frequently demonstrated in the pectorales majores in asthenic states, and of little diagnostic value, but its frequent unilateral presence in early doubtful cases of pulmonary tuberculosis most certainly suggests a unilateral cause; if a suspicious apex is found, unilateral myotatic irritability should certainly be taken into consideration in coming to a conclusion.

The following is an interesting case of myotatic irritability:

A case of subglenoid dislocation of the shoulder after two attempts at reduction by Kocher's method was reduced under anaesthesia; early passive and active movements were employed with good results, except excruciating pain, which lasted for a considerable time, due, no doubt, to a synovitis in a rheumatic subject. During this time marked fibrillary tremors could be elicited, chiefly over the deltoid. This sign should, if reliable, be of value in differentiating between genuine and malingering cases in medico-legal work.

No doubt the peculiar bronzing in Addison's disease is a neuro-pigmentary change resulting from involvement of the suprarenal capsules and sympathetic systems by new growth. The following case seems to support this theory:

A woman, aged 50, suffered from gastric carcinoma, but refused operation. However, in the later stages she developed a pigmentation like that of Addison's disease, and the deduction was that this was due to an implication of the sympathetic by growth or glands, suggesting that such a condition might be looked upon as a neuro-pigmentary change in the skin due to disease of a deep-seated organ.

In conclusion, it may be claimed that cutaneous hyperaesthesia is of considerable value in the diagnosis of acute ulceration of viscera; that the neuro-muscular reaction is of some value in the diagnosis of inflamed viscera; that myotatic irritability is by no means a negligible quantity; and the suggestion that there is a neuro-pigmentary sign in the skin of visceral disease proves that the question of superficial evidence of deep-seated disease is a far larger one than it at first seems, and offers considerable scope for both observation and research.

ORIENTAL SORE OF NORTHERN INDIA A PROTOZOAL INFECTION:

A PRELIMINARY COMMUNICATION ON THE ETIOLOGY OF THE DISEASE AND THE EXTRA-CORPOREAL CYCLE OF THE PARASITE.

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SURGEON-MAJOR D. D. CUNNINGHAM, Indian Medical Service, in 1885 was the first scientific observer who recognized the parasite causative of Oriental sore. He regarded the clusters of parasites he noted in the lymphoid cells as representing various stages of some simple organism constituting the virus of the disease. Since that date many observers, such as Deperet, Boniet, Ducloux Heydenreich, Riehl, Poncet de Cluny, Brocq, Veillon, Weber, Vidal, Colvill, Hickman, Nicolle, Noury Bey, have put forward cocci, streptococci, achi-zo-mycetes, etc., as the cause of the disease. Wright has recently redescribed these bodies under a new name, *Helcosoma tropicum*. Oriental sore is a name given usually to a circumscribed inflammation of the skin that occurs endemically in tropical and subtropical countries. Several types of Oriental sore exist, as will be shown later. The special characters of this disease are its long duration, slow cicatrization, and the fact that it is contagious and autoinoculable in the person infected.

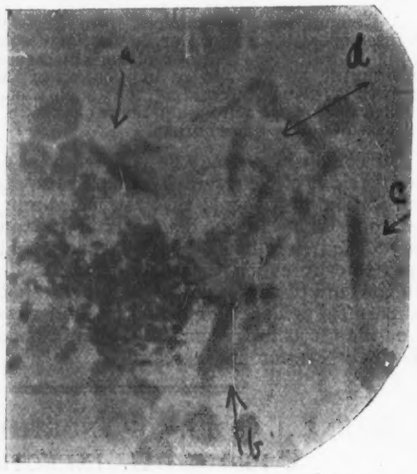
Synonyms.—Mycosis cutis chronica (Carter); Lupus endemicus (Lewis and Cunningham); Bessel timour (Arabian); Salik (Persian); Tochiban (Turkish); Päscha churdj, Afghan jhara (Afghanistan); Godownik (Russian); Monghry phora (Punjab); Chambal (N. India).

This affection is often limited in distribution to certain towns and districts, hence its varied nomenclature. It is a disease about which little has been known, save that it is probably introduced into the body through injuries of the integument. The exact period of incubation is still unknown, as is also the invertebrate host. The only part of the body immune against a second infection is a scar area resulting from a previous infection. It appears in the tropics at the beginning of the cool season, and in subtropical regions in the autumn or late summer. Age, hygienic conditions, food, sex, race, and constitution play no part in the etiology.

It is interesting to note the distribution on the body. In a series of 1,154 Oriental sores seen during 1903 and 1904 in South Arabia, 24 cases seen in Poona, 162 seen in Jacobabad and Quetta, 8 in Jhansi, and 5 in the Zakka Khel country, a total of 1,405 sores during seven years, the Arabian cases showed 914 sores on the lower limbs,

113 on the upper limbs; the greater majority of these were in the neighbourhood of the elbow-joint; 26 were on the face, either on the forehead, side of the nose, outer or inner canthus of the eye, or side of the cheek. The Poona cases showed 14 sores on the back of the elbow-joint, 1 on the wrist, the remainder on the face. The cases from Scinde and Baluchistan showed 103 on the face, 15 on the arms, 3 on the body at the nape of the neck. The remainder were on the lower limbs, excepting 6 cases, which were all upon the forehead. The distribution of the sores in the recent cases upon which the protozoological parts of this paper is based is described later.

In the light of the experiments described below, it is certain, in the first place, that true Oriental sore is due to a localized cutaneous infection by one or more species of protozoon which can under suitable conditions in culture develop from the early inert torpedo or cockle-shaped forms found in the infected tissues to the fully-developed monadine flagellated organism crithidial in type.



Figs. 1 and 2 represent the same cluster of parasites that have developed to the flagellated monadine stage, and other forms in symbiotic relationship with a group of bacteria. (Fig. 1 is an untouched photograph.) Note group (*a*) consists of two dividing flagellated monadine forms adjoining which a flagellated scarlet-pink parasite of a circular form lies. Their point of apposition is in the neighbourhood of the nucleus common to the two, forming daughter monadines. (*b*) A simple rosy but not flagellated body lies apposed to the daughter monadine forms. (*c*) Early typical crithidial form, though blunted somewhat. (*d*) Group containing perfect flagellated monadine forms, the one rosy pink below and circular, the other crithidian in shape.

In the second place, it is certain that the view held by Manson and other workers, that the parasite of Oriental sore represents a localized infection by *Leishmania donovani*, whereas kala-azar is a generalized infection of the body with the same parasite, is entirely wrong. The parasite, though morphologically somewhat similar in the early form of the Oriental sore, differs from Leishmania as much in culture as it does in the manner it attacks man, in that the parasites develop to their final stage of flagellated organisms in symbiotic relationship with cocci and bacteria. Further, it is interesting to note that two forms of the parasite occur in culture, the one a blue-staining flagellated organism, the monadine form representing, in my opinion, the motile sexual form, possibly the male element, the other a red-staining flagellated organism entirely different, possibly the female element. The fact that these two latter forms are found frequently in pairs is highly suggestive of sexual interchange of elements, previous to the gregariniform phase. The third type found in culture are minute coccoid-like protozoa, the resistant gregariniform phase, or the earliest form of the parasite from which the common types found in the Oriental sore arise.

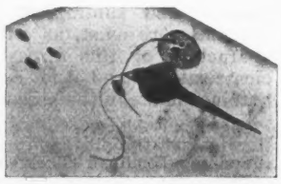


Fig. 3.—A pair of flagellated organisms of the two types described. A photograph was taken after forty-eight hours, and the diagram drawn to scale with a ⅛ apochromatic objective and 12 compensating eyepiece, and parallel to the parasites seen in the centre of the plate.

The classificatory distinctions between the various insectan flagellates, and their relationship, if any, to the trypanosomes of vertebrates, the questions of their evolution and phylogeny, would seem to have afforded many protozoologists a field for obscure speculation of as yet little practical value. Much controversy has recently taken place as to what position the herpetomonadine parasite of kala-azar should take in the order of protozoa; this is mainly due to the fact that the cytological differences between the parasitic genera herpetomonas, crithidia, and trypanosoma are not clearly recognized. For this reason, ere giving a brief preliminary description of what would seem to be a crithidial infection in man, I propose to mention types of each genus showing the cytological dstinctions between the genera.

The genus herpetomonas is parasitic in non-biting flies and plant-frequenting bugs. A herpetomonas presents when full grown its extranuclear centrosome at its extreme anterior extremity, separated by some distance from the nucleus; the flagellum arises from the neighbourhood of this body, and is without any undulatory membrane. The body of a herpetomonas is elongated and slender, often acicular, the posterior end usually tapering away finely. This genus herpetomonas may be divided into:

1. Leishmania, a genus parasitic in mammals (type *L. donovani*).
2. Leptomonas, a genus parasitic in the gut of plant-frequenting bugs (*L. drosophilia*).
3. Herpetomonas, a genus parasitic in non-biting flies and plant-frequenting bugs (type *H. muscae domestica*, *H. lygaei*).

The genus crithidia is parasitic in leeches, ticks, mosquitos, predatory and plant-frequenting bugs, and in the gut of biting flies. In this genus the flagellated organism presents a rudimentary undulatory membrane, whilst the extranuclear centrosome lies anterior and close to the nucleus. In crithidia the body differs from herpetomonas in being much shorter, wider, and more pyriform; the hinder end is sometimes drawn out, but usually terminates in a rounder, more obtuse manner.

The genus trypanosoma is parasitic in vertebrates, the gut of non-biting flies, etc. The flagellum usually has a definite undulatory membrane, though this may be absent. The extranuclear centrosome is usually at the posterior extremity, but may be seen in any position anterior or posterior to the nucleus. This genus thus performs a kind of connecting link between herpetomonas and crithidia.

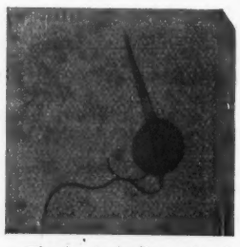


Fig. 4.—A similar pair of flagellated organisms. The diagram is drawn to scale under the same conditions as the previous plate, and parallel with the parasites seen in the centre of the plate.

Both herpetomonas and crithidia are genera whose distinction is based upon the size and shape of the monadine form, and show in general an alternation of monadine flagellate, with gregariniform resting or non-flagellate phases. In the latter the parasites are seen as small rounded pear-shaped or oblong bodies, attached in great numbers to epithelial cells, etc.

The parasites present in this stage two chromatic elements; a nucleus with its intranuclear centrosome lie close to each other at the base of the cell. In some species a trace of the flagellus attached to the extranuclear centrosome is seen.

Bearing in mind the above facts, it is interesting to find that the species of crithidia which I have successfully cultivated from the human being presents, under cultural conditions, both the fully-developed monadine as well as the gregariniform phases.

Oriental sore is a name given to an affection which presents several types. The classical type is as follows: A small red spot resembling the bite of an insect appears

on the surface usually of some exposed part of the body. A minute nodule, intensely itchy and irritating, forms. The top of this is scratched off by the sufferer, and from the raw area a thin serous fluid exudes. A yellow scab forms on the raw surface. In about forty-eight hours the edges of this scab are ringed by a thin line of inflammation, and the scab slowly grows at the expense of the surrounding tissue. If the scab is removed a shallow ulcer is seen to have formed. Infected spots occasionally appear beyond the line of inflammation; these join with the parent ulcer, and thus the regular shapes seen in some cases arise. After some weeks the sore has assumed the characters of an ordinary deep ulcer—its base covered with indolent granulation, its walls eaten out, and the circumference of the sore raised and angry-looking. The ulcer alternately scabs over and breaks down. After months of discomfort, cicatrization sets in at one side of the ulcer. This may break down, but as a rule a slow cicatrization, progressing faster than the gradual advancing line of destruction, finally overtakes the latter, and the sore, after a duration of often over a year, heals, leaving a dead, whitish-blue scar. Other parts of the body may get infected by the scratches of the sufferer, or in Oriental countries by the infection of skin abrasions by flies, for whom the Oriental sore of this type seems to have a peculiar fascination. Swarms of *Musca domestica* and other flies constantly buzzing around the infected area torment the patient unless antiseptic dressings have been applied.

THE BEST MEDIUM AND TEMPERATURE FOR CULTURE OF THE PARASITE.

As result of experimenting with a series of over fifty different blood media at different temperatures, the medium that was found to exactly meet the requirements of the protozoal parasite was made as follows:

To 29 c.cm. of sterilized citrate solution 10 per cent. add about 3 c.cm. of fluid expressed from the edge of the sore, which contains myriads of the tiny torpedo-shaped and cockle-shaped parasites typical of the disease.

It is advisable to bore through the rosy margin of the sore to a depth of about ¼ in., or ½ in. towards the centre of the infected area, with a short, fairly fine glass pipette, whose tip has been broken off. Smart pressure will give a steady flow of infected blood and serum.

This infected mixture should now be covered, ringed with vaseline, and placed on ice until the remainder of the medium is made up. Take 50 c.cm. of normal human venous blood and allow to stand in an ice chest for an hour. At the end of this time break up the clot with a fine glass rod and stir until the whole mass is finely broken up. Pour the fluid portion of the blood and serum into sterilized centrifugal tubes, seal with waxed corks, and centrifugalize until large columns of clear serum are obtained. Place these tubes of blood in an incubator and keep them at 56° C. for five minutes, then allow to cool to 28° C., or laboratory temperature.

Make a series of fifteen pipettes for cultures as follows: Blow a large glass bulb in the centre of a 3½ in. piece of ordinary glass rod, then make a long, narrow-drawn out area above it, twist this whilst soft so as to make a circular tube of narrow calibre above the bulb. Flame the tube until very soft below the bulb, and draw out until a long, thick capillary tube 7 in. is made. Cut and seal this capillary tube. Plug the short upper end of the tube above the circular tube with wool and sterilize in hot air.

Following the usual laboratory methods, make a mark on the capillary tube about ½ in. from the bulb. Take the volume of the tube from this point to the other end as one unit, and draw fluid up in the bulb with a large rubber teat on the plugged end of the tube. To four units of clear non-activated serum, add four units of red blood cells collected below the fine white cell buffy layer. To this add three units of sterilized citrate 10 per cent. and mix the constituents freely in the bulb by shaking. To the mixture add four units of infected citrate taken from the sedimented organisms which lie with red blood cells at the bottom of the watch glass. Mix thoroughly in the bulb, seal the capillary tube.

Thread the tubes so prepared on a glass rod bent to three sides of a rectangle and just able to slide into the upper shelf of an incubator. Keep this incubator at 22° C.

At the end of thirty-six hours, practically every tube shows myriads of single protozoa and large clumps of the parasites in all stages, from those found in the sore to the free flagellar forms.

There are many limits within which I have altered my constituents and temperatures and got positive results, but the above is the most certain and most perfect as yet attained.

The important points to be noted are: (1) The red cells and serum must be heated to 56° C. for five minutes; (2) the medium must be highly acid; (3) the parasites must be freely mixed up with the constituents of the medium ere the red cells deposit with them in the capillary tube; (4) white cells should be avoided as much as possible.

In a successful culture flagellar forms increase in enormous numbers up to a hundred and twenty hours, and ive symbiotically with masses of cocci and bacilli. Parasites are found in large clusters (flagellates) in forty-eight hours. In seventy-two hours pairs of flagellated organisms are frequently found, the one parasite crithidial in shape and staining blue, the other oval or circular and staining rosy pink; the two organisms are apposed to each other at or about the level of the nucleus of the crithidial form. These pairs are first seen in cultures forty-eight hours old; the rosy flagellate form then is usually smaller and stains deeper.

DIFFERENTIATION BETWEEN KALA-AZAR AND ORIENTAL SORE.

Kala-azar.	Oriental Sore.
Family Distribution.	
An extraordinary tending to attack a number of persons in the same family or household, this family incidence clearly pointing to house infection.	Rarely, if ever, more than one person attacked.
Age Incidence.	
Children most commonly attacked.	Adults the rule.
Race Incidence.	
Immigrants rarely attacked before eight years' residence in the East. The majority of patients seen are natives.	Immigrants attacked within a few months' to a year's residence in East. The majority of patients seen are natives.
Seasonal Incidence.	
No seasonal incidence known, though it is probable that the majority of cases are infected in the cold season.	Affection first appears usually from September to April, and may last for sixteen months and more.
Fevers Typical of the Disease.	
Double remittent type of fever in certain cases. Double continued type. Low continued type. Frequency of different types of fever in various stages of the disease.	No fevers.
Recovery after Septic Complications.	
Such as cancrum oris.	Septic complications no effect as the parasite thrives best in cultures with masses of cocci and bacteria.
Effect of Quinine.	
Large doses in early cases have cured.	No result.
General Symptoms in Kala-azar.	
Early cases gave history of rigors daily.	None.
Headache.	None.
Sickness.	None.
Bowels. One-third of cases in hospital show diarrhoea, dysentery in 7 per cent. of such cases.	No bowel trouble.
Spleen and Liver.	
Enormous enlargement of both viscera.	None.
Coagulability of the blood decreased.	Increased.
Distribution of the Parasite.	
Polynuclear leucocytes infected.	Superficial polynuclears rarely, if ever, contain the parasites, whereas they swarm in the large mononuclear cells seen in a smear.
Spleen, liver, bone marrow infected heavily.	
Intestinal ulcers and cutaneous ulcers contain the parasite.	
Cultivation and Development of the Flagellated Stage of the Parasite showing differences between the two Parasites.	
At 27° C., in blood containing citrated 10 per cent., parasites live for several days and multiply, but there is no material alteration in their form and no increase in size.	At 28° C., in infected unheated undiluted serum with no citrate, flagellar forms appear in five days.
At 22° C. and not above 25° C., flagellated forms appear.	At 28° C., flagellar forms have been obtained.
Exposure to a temperature of about 25° C. causes rapid death and degeneration of the developing forms.	

Cultivation and Development of the Flagellated Stage of the Parasite showing differences between the two Parasites (continued).

Kala-azar.	Oriental Sore.
Sterility of the culture tubes of crucial importance. Contamination with micrococci and bacteria cause rapid death degeneration of the parasites, staphylococci the most deadly contamination for the parasite.	Contamination with micrococci and certain bacteria highly favourable, as the parasites develop symbiotically with masses of these organisms.
	Staphylococci the most favourable contamination. Further, the most perfect monadine forms are seen attached to large masses of staphylococci.

STAGES IN LIFE-HISTORY NOTED IN THE PARASITE OF ORIENTAL SORE.

1. Monadine crithidium. Very large, and several times the length of a red cell; staining blue, with a scarlet flagellum, carmine extranuclear centrosome, and rosy-violet nucleus.
2. Flagellated rosy-pink parasite; body oval or circular; apposed to the above at about the level of the nucleus of the monadine crithidium. This presents a small dark-violet staining nucleus, and an extranuclear centrosome staining carmine, from which a long scarlet flagellum arises.
3. Gregariniform phase of clusters of small parasites, circular, ovoid, or bean-shaped, like enormous cocci. In these the nucleus stains violet. The extranuclear centrosome, when seen, stains red-rosy, and the cytoplasm of the cell pale pink. A few are rose coloured throughout. These clusters are usually found surrounded by masses of bacteria and cocci staining pale blue.
4. Early forms of the parasite, showing pyriform, ovoid, and torpedo-shaped elements as ordinarily seen in the infected tissues.
5. Larger pyriform cells.
6. Larger rosy bodies.

The two latter frequently occur in the same group, which may consist of 120 to 200 parasites.

The best method of obtaining clumps of the protozoa from cultures is as follows:

Blow the contents of the infected tube into a sterile watch glass gently, then suck up a large drop of red blood deposit; drop this on one end of the slide, and with a fine glass pipette, avoiding actually touching the slide, draw a level film of infected blood serum and citrate to within an inch of the other end of the slide. On removing the glass pipette a large streak of blood mixture remains. Stand the slide on its end against a bottle so that this slowly streams towards the centre of the slide again; when a thickish film is thus made dry in air and fix in methylic alcohol for five minutes.

The most satisfactory stain for the parasite in all its stages is made up as follows: To 10 c.cm. distilled water add 12 drops of Giemsa solution, shake and pour on the slide, film upwards. Leave to stain for twenty minutes.

At the end of this time the slide will be dark purple. Wash under the tap for thirty seconds and dip into a watery solution of eosin, 1 in 50,000, for about thirty-five to forty seconds. The film should then seem light rosy-violet. Care must be taken not to stain the film too red.

On examination of a perfectly stained film the torpedo and cockle shaped forms show up clearly against the faint rose-coloured red cells; the early pyriform and large flagellated monadine forms show up light blue, with scarlet flagella, their nuclei stain purple, their extranuclear centrosomes stain scarlet.

Bacilli and cocci stain deep violet.

The gregariniform phase of the parasite stands out clearly, for these are seen to be four or five times the size of the cocci; their cytoplasm stains rosy-pink, their nuclei violet-blue.

FEEDING EXPERIMENTS.

In a netted cage a mixture of formaldehyde solution (two teaspoonfuls to a pint of water) was placed in an open-mouthed bottle. Over the mouth of the bottle was laid a square of cardboard with a circular hole in it slightly less in circumference than a watchglass, which filled the hole.

The reasons for this procedure are that the vapour of the formaldehyde solution is especially attractive to the fly, but as any fly drinking the solution dies in three to five minutes, the watch glass and cardboard square prevents the insects from feeding on the poisonous solution.

Into the watch glass was squirted a small tube full of non-activated slightly acidulated serum highly infected with protozoa in the early stage from the sore. A second tube of non-activated red blood cells was then added, and the constituents of the infected medium thoroughly mixed. Some fifty *Musca domestica* were then captured, the gut of ten were examined, and the usual infection with *Herpetomonas musca domestica* noted. In no case were typical large crithidial parasites noted.

The remainder of the insects, on being placed in the netted cage, greedily swarmed round the watch glass, and distended themselves until their bodies were scarlet with the ingested red cells. After twenty-four hours several flies were dissected, and their gut contents showed crithidial, monadine parasites, highly suggestive and indistinguishable from the forms obtained in culture. After forty-eight hours all flies examined showed crithidial forms. After forty-eight hours the remaining flies were found dying or dead in the cage.

From these feeding experiments I believe that though the common fly in the East may not be the actual invertebrate host that infects men with Oriental sores, the parasite does develop within the gut of *Musca domestica*. This development to the monadine form is therefore probable in other flies, and the actual biting flies, ticks, or mosquitos that transmit the disease should be sought for.

Further, it is necessary to determine whether members of the herpetomonas and crithidia genera are able to develop monadine forms in other hosts than are at present usually accredited. Our present knowledge on these groups is essentially scanty, and much work requires to be done.

As this is only a preliminary communication, the many problems that have arisen in connexion with the work will be dealt with later. In view of the fact that Surgeon-Major Cunningham, I.M.S., discovered the cause of the disease, I consider the name *Crithidium cunninghami* would best be applied to the parasite. *Leishmania cunninghami* is the most appropriate, failing this.

THE INTENSIVE TREATMENT OF SYPHILIS BY AACHEN METHODS.

BY REGINALD HAYES, M.R.C.S.ENG.,
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IN spite of its many competitors now and in the past, mercury may safely be said to remain the most potent and generally satisfactory agent for the treatment of syphilis. The rapid advance of medical science in our day will, perhaps, eventually lead to the substitution for mercury of a vaccine or serum. As yet, however, serum therapeutics have failed to be of service—owing not only to the lack of a satisfactory method of cultivating the treponema outside the human body, but (as indicated by Neisser[1]) to the difficulty, if not the impossibility, of obtaining a mitigated virus.

The current modes of administering mercury may be classified, broadly, as the continuous and the intermittent. Of these, the first is that most generally in vogue in England and the United States. It is a method unsuitable in the presence of urgent symptoms, as in cases of cerebral syphilis, when every hour counts, for when mercury is given by the mouth the patient is brought under its influence only by slow degrees. Neumann confirms this view.[2]

The experience of many authorities tends to show that the treatment of syphilis by small doses of mercury given by the mouth is not protective against secondary and tertiary mischief. Sir Felix Semon[3] recently stated that almost every patient he had seen with severe tertiary syphilis of the upper air passages had undergone mercurial treatment by the mouth in the early stages of the disease, not a few of them for the two years enjoined by Sir Jonathan Hutchinson.

Of those who adopt the intermittent method—that generally in use on the Continent—some give the drug, as it were, by schedule, in definite courses and at regular intervals, others only when there is a manifestation of the disease.

To enable the body to recover its auto-defensive mechanism, a period of medication is followed by one of rest, further treatment being given in accordance with a procedure which has proved to produce the best results. Clinical experience is now supplemented by examination of the patient's blood serum according to Wassermann's method, from which most valuable information is obtainable both as to the necessity and duration of treatment. Lesser's[4] investigations with this test tend to demonstrate the superiority of the intermittent over other methods. It

has the further distinct advantage of ensuring direct treatment by the medical adviser.

Disadvantages, more or less incidental to all forms of injections, are the possibility of severe pain, troublesome induration, abscess and embolism, as well as our inability to control the effect of the drug after introduction. The patient's dread of the needle, too, must be taken into account.

Calomel fumigation has largely fallen into disuse, its effects being uncertain and somewhat difficult to control.

Against the inunction method there are none of the objections which have been advanced against the other two. It is with this that the name of Aachen has become associated. Impressed by the benefit derived from the treatment there by patients coming under my observation, I resolved to investigate on the spot the method as well as the results obtained. While there I heard interesting accounts from patients presenting symptoms of tabes, who formed, as usually, a considerable proportion of those undergoing treatment. Some had been told by authorities of acknowledged eminence that they must resign themselves to the discomforts incidental to their condition as inevitable and incurable; yet after having been, in some cases, reduced to absolute ataxia, they had been sufficiently restored by the treatment to be able to walk and enjoy an existence of modified activity.

With the methods of inunction, as carried out in England, I was of course familiar, and I was very favourably impressed by the contrast in the technique at Aachen.

Most striking there is the attention paid to detail. A thorough and exhaustive physical examination is made before treatment is begun. The heart, lungs, kidneys, nervous system, and teeth are each in turn carefully considered. To describe the usual procedure: The morning is commenced with a drink of from one to three glasses of the sulphur water. Next comes the bath, temperature and length of immersion being carefully adapted to the patient and to the type of disease. This is succeeded by a rest and breakfast in bed, to be followed soon after by application at the hand of an expert rubber of a 33⅓ per cent. mercurial ointment for twenty to forty minutes, the quantity and site of inunction varying according to circumstances. The thighs, calves, arms, and back are usually treated consecutively from day to day. The groins and axillae are avoided. Though in England frequently subjected to inunction, these parts are quite unsuited for thorough and prolonged application.

Stress is laid upon mouth hygiene. A soft toothbrush is used after meals, and a mouth-wash frequently during the day. These precautions permit mercury to be administered, if necessary, even to the point of causing a condition of general lassitude and drowsiness, or intestinal cramps, without the occurrence, save very rarely, of salivation or gingivitis. The extreme potency of inunction as compared with internal administration has been illustrated in my experience by cases in which the presence of a stump, or neglect of the mouth toilet for even a day or two, have rapidly caused gingivitis during its application in patients who had previously taken courses of mercury by mouth for months together without buccal discomfort.

Articles of diet calculated to produce looseness of the motions, such as white wine, uncooked fruit and vegetables, are forbidden. Early hours are advised, and moderate use of or complete abstinence from tobacco, especially when the mouth or throat is affected. Plenty of fresh air and exercise, short of fatigue, are found also to contribute in no small degree to the attainment of a good result.

The length of treatment for an ordinary case of syphilis during the first two years has hitherto been about six months, taken in courses of from four to six weeks, with intervals of rest. During part of this time some preparation of iodine or a tonic may be prescribed with advantage. Many authorities, moreover, as the result of clinical work, regard with favour a further short course yearly for three or four years. Towards a decision in this matter, again, valuable assistance can now be obtained by an appeal to the serum test.

Henri Pelon[5] advocates the longer continuance of treatment, on the ground that though tertiary conditions have their apogee at three years, they may continue much longer. He further lays stress on the fact that general paralysis, beginning about the fourth year, becomes progressively more common up to the tenth year. Cerebral syphilis is common between the fourth and eighth years. Tabes reaches its culminating point between the fifth and ninth years. Thus, from the fifth to the tenth year, that is to say, when treatment has usually been abandoned, the patient is peculiarly liable to the three worst complications of syphilis.

In tabes, the experience of Brandis and Feibes,[6] extending over a long period, points to the advisability of a prolonged course of consecutive rubbings, 100 to 200 not infrequently being given. Special attention should in the meantime be directed to maintaining the general tone, an end to which galvanism and arseniate of strychnine may prove valuable adjuncts.

Improvement is generally slow. Whether a particular case will do well or not, time alone can show. Some progress favourably; others, though to all appearance in the early stage and presenting an eruption, lose ground. It is impossible to tell clinically, except by a trial of therapeutic measures, whether the initial and possibly curable stage of cellular infiltration has or has not been succeeded by the graver condition of fibroid degeneration. It may be, indeed, that not true tabes, but a spinal syphilis presenting similar symptoms has existed where good results have been obtained.

By submitting the patient's blood to the Wassermann test, and making a lymphocyte count of the cerebro-spinal fluid before, during, and after treatment, diagnosis, prognosis, and indications for length of treatment, now bid fair to be placed on a more scientific basis. The evidence pointing in this direction is already both considerable and interesting.[7]

The onset of the toxic effects of mercury in the various organs may be manifested—in the heart by palpitation, in the kidneys by albuminuria, and in the blood by decrease in haemoglobin and disproportion of red to white corpuscles. In the nervous system it may be evidenced by tremors, and in the bowels by cramp and catarrh, while in the mouth it may be indicated by salivation, gingivitis, and ulceration. The subjective sensation of the patient is useful in estimating the effect on his general health. A steady loss of body-weight which cannot be otherwise explained calls for temporary cessation, or modification, of treatment.

When, therefore, I point out the necessity for frequent and methodical examination of the various systems during this intensive treatment, the caution is more than a mere truism. Experience alone will enable one to recognize the warnings as to when the limit of physiological tolerance has been reached, and so to stop short of the further stage of toxic influence.

Dealing with objections urged against inunction, stomatitis is usually associated with neglect of orders. Inunction has been stigmatized as dirty, but we have the testimony of patients that inconvenience in this respect is usually quite trivial. As to its being "advertizing and compromising," I have frequently treated patients living with their wives and families without arousing any suspicion or disturbing domestic harmony. Its success, certainly, is dependent upon skill in rubbing and upon proper supervision. It cannot be applied if there is much scarring or thickening of the skin, as after variola, or in ichthyosis. Certain eruptions, or very tender skins, preclude its use, as does a marked intolerance of mercury. It involves, of course, the devotion of some time daily to treatment. Diarrhoea, dermatitis, lassitude, muscular fatigue, and pain in limbs are, indeed, consequences which may have to be reckoned with. As to inequality of action, that may not improbably be due to the idiosyncrasy of the patient or to the varying capability of the rubber.

The advantages of inunction, on the other hand, include safety, potency, and painlessness, as well as freedom from most of the objections mentioned in connexion with injections or internal administration. As it does not interfere with the digestive system, it permits of the simultaneous use, if necessary, of drugs by the mouth and of subcutaneous or intramuscular medication. In theory the utility of the intensive treatment by inunction has long been more or less recognized, but we are now in a position to avail ourselves to the full of its advantages, thanks to the results of the Wassermann reaction. By this means we can ascertain at any moment, in a large percentage of cases, the degree of the drug's effect on the poison.

Striking unanimity exists among the chief authorities as to the virtues of inunction. Fournier, for instance, says[8] that he has perfect confidence in inunction *when well performed*; and, again, that he is satisfied that it is equal to, if not better than, any other line of treatment. Neumann expresses a similar opinion.[9] It is valuable, I may add, if antecedent morbid states of the stomach or intestine preclude ingestion, and further, when it is required that the stomach should be left free for other remedies.

The Aachen treatment undoubtedly owes its peculiar efficacy largely to thoroughness and close attention to detail, but balneo-therapeutics too have an important share in the results. The sulphur water, unless it directly assists the mercury, would be of secondary importance. But there is evidence that it does so assist. The modern view, as expounded by Chatin of Uriage, is that mercury, shortly after its introduction into the body, is converted into an insoluble albuminate, and is subsequently stored in the tissues as a partially inert body. The H_2S of the mineral water, however, unites with this and converts it into an active soluble compound, which circulates freely and is easily eliminated. Thus in conjunction with sulphur water mercury can be given freely, the ease with which it is eliminated being shown by the amount recoverable from the urine. At the end of a course of mercurial treatment without sulphur water the amount of the metal excreted in the urine has been measured for a series of days, and subsequently during a similar series of days while the patient was taking sulphur water by mouth. During the second period the amount of mercury so recovered was noticeably in excess of that recovered during the first. Consequently, large doses of the metal may be given with the certainty that on the one hand they will not prove therapeutically inert, and that on the other their toxic effect will be minimized. Temporary cessation in taking the waters during inunction is often followed by symptoms—such as lassitude, cramp, etc.—which disappear upon resuming them in proper quantity.

Perhaps the fact that introduction is effected by way of the lymphatic system, the original stronghold of the treponema, and that it enters over such a large area, may explain the rapidity with which early symptoms usually yield to its use, while in such late stages as disease of the cerebro-spinal system its application close to the seat of mischief, by the rubbing of the back, may partially account for the good results, which are possibly assisted to some extent by inhalation of the drug volatilized by the skin.

Many may not be able to go to Aachen. Business and other considerations may interpose, among the others not the least deterrent, perhaps, being the almost inevitable stigma attached to a sojourn in a place with such a very specific reputation. It is thus of practical interest to know that the treatment can be effectually carried out in this country, the Aachen routine being closely followed. The bath salts, drinking water, etc., are procurable here, and can be quite as efficiently administered.

In this account of the various modes of treatment I have endeavoured to deal as fully and accurately with my subject as limitations of space have allowed, but throughout I would have it borne in mind that the corporeal reactions to mercury are apt to be disconcerting. Experience and close attention must go hand in hand if the best ultimate results are to be attained with the minimum of inconvenience.

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THE latest number of the series of bulletins with the title *Experiment Station Work*, issued by the United States Department of Agriculture, contains a note upon the effect of machine milking on individual cows. It appears that not all cows take kindly to machine milking, but that if this method is adopted in the first lactation it presents very decided advantages. For cows that have been accustomed to hand milking the machine does not answer well.

A CASE OF SYPHILIS WITHOUT A PRIMARY CHANCRE.

SYPHILIS D'EMBLÉE, FOLLOWED UNDER TWO YEARS BY REINFECTION.

BY A. C. MAGIAN, M.D., B.CH. VICT.

SYPHILIS D'EMBLÉE is, on the whole, so rarely seen that it is probable that the description of a carefully watched case will be of interest to syphilologists, particularly as it was followed by reinfection.

Two years ago I was visited by a gentleman in a great state of mental distress, who informed me that he was afraid he had contracted a venereal disorder three days previously. He gave me full particulars of the affair, from which it appeared that sexual congress had been very brief, and he had afterwards washed the penis well with soap and water, an interval of about a quarter of an hour having elapsed between the two acts. Before leaving he became suspicious of something wrong through noticing a rash on the partner's arm and receiving evasive answers to his anxious inquiries. This was only the second time in his life that he had had sexual intercourse, the first occasion having been two and a half years previously, after which no untoward result had followed. He was to be married the following day, and was, in consequence of his doubtful condition, very anxious about himself. I informed him of the impossibility of immediate diagnosis, but cautioned him of the danger of infection, and strictly forbade sexual congress with his proposed wife. A week later he came to me again, this time to confess that under the stress of great excitement on his wedding night he had disobeyed my instructions and without any protection had had intercourse with his wife. He was very penitent for his fault, and appeared crushed when I pointed out to him the risks to which he had subjected his innocent wife. He solemnly declared that there should be no further transgression; but I reminded him that this was now equivalent to locking the stable door when the horse had escaped. Eventually he suggested to me that I should make a thorough examination of him every day, so that if anything developed it might be attended to at once. I refused at first to do this, saying that such a proceeding was unnecessary, and that he might come to see me as soon as he noticed anything himself. My patient, however, pressed the matter so hard that at last I consented to do as he wished. I was the easier persuaded to fall in with his desire as I wanted for my own satisfaction to see the very earliest appearance of a chancre, and fancied that this might give me the opportunity. This went on for a fortnight and nothing was noticed, and I informed him that at any rate he was free from gonococcal infection. A day or two later he informed me that he had been reading about syphilis in a medical book, and had learnt therefrom that sometimes extragenital chancres were developed. He therefore asked me if I would mind making a general examination of his whole body in case this rare occurrence should happen with him. I inquired if he had received any scratches or had practised any abnormal methods, but was assured that he had not. I made the examination he asked for twice weekly, and reduced the examination of the penis to every second day. This went on up to the end of the sixth week, after which a complete examination was made every third day only, as both of us had by that time decided that infection was extremely improbable.

Eight weeks passed, and the gentleman was considered free from any venereal disease, but to be on the safe side was instructed to call once a week for another month, and to report himself at once should anything develop in the meantime. The examinations which I made were carefully done, and I was convinced that nothing had been overlooked. There was no suspicion of a chancre or sore of any kind whatsoever on any part of this patient's body, and urethra, rectum, and mouth were equally free from disease. Yet at the beginning of the eleventh week he came to me with his body covered with a roseolous rash; chest, back, and abdomen were thickly marked, and also the flexor aspects of the arms. The rash slowly altered and became a mixed eruption of papules, pustules, and the original roseola. A sore throat followed, and the unfortunate man lost almost all the hair from the top of his head. At the twelfth week his wife aborted of a 3 months fetus; I therefore put both parties upon active antisyphilitic treatment, and gave them instructions as to future marital relations. The husband now began to suffer from extreme depression. Finally, he surprised me by bringing the author of his troubles to be examined, this party having strenuously denied to him that she had ever been afflicted with any venereal complaint. I found marked evidence of syphilis in the presence of mucous tubercles and condylomata.

The further history of the case is as follows: At six months the patient developed a mild attack of iritis, which was quickly cured, but followed by persistent diarrhoea and a small amount of albumen in the urine. Complete intolerance of mercury was the next trouble, although previously the patient had been taking it without any difficulty. I substituted iodides, and for a time all went well, and the diarrhoea and albuminuria disappeared. At nine months an eruption almost exactly like smallpox broke out. This eruption was cured by mercurial fumigation, which the system now tolerated. Mixed treatment with

mercury and iodides was resumed with success, and all went well until the end of fifteen months, when periostitis of the left tibia began, and a small gumma was found in the right testicle. By increasing the dose of iodides both these complications were got rid of. Now with regard to the wife: As far as one could find out—and I may say that I examined her myself once and her husband many times—no sore was ever discovered, but directly after the abortion she broke out in a pustular eruption exactly similar to that which her husband had had. A few weeks later mucous patches on the under surface of the tongue and an ulcerated throat were noticed and treated. She then became suspicious of her huband and left him. This series of disasters almost unhinged my patient's mind for a time, and at one period it appeared inevitable that the man would lose his reason. Eventually, however, he recovered, and then gave himself up to a somewhat fast life, presumably with the idea of forgetting the past. Remonstrance was in vain, and although he continued with treatment under me, he totally disregarded my advice as to his mode of living. The most extraordinary part of the whole affair was still to come. He went back to his former mistress and cohabited with her, and two months ago he presented himself at my rooms and exhibited a typical Hunterian chancre on the glans penis.

Here, then, was a man actually under treatment with mercury and iodides, suffering from undoubted syphilis, and reinfected in a period under two years with the same disease. I temporarily suspended all treatment in order to see what would happen. The chancre became very hard, and the surrounding tissues extremely indurated, and then the patient went through all the programme of the previous infection. He developed roseolar, papular, and pustular eruptions; he began to lose his hair, and ulcers of an undoubtedly specific nature formed in his mouth and throat. I then started treatment energetically with mercurial inunctions and internal medication, and he is now rapidly improving.

In conclusion, I might say that up to the time of the first infection the patient had enjoyed perfect health, and had never had occasion to obtain medical advice. He was an Englishman of good position, 40 years of age, and had been circumcised as a child.

A NOTE ON VERY HIGH SPECIFIC GRAVITY OF THE URINE IN HEALTHY WOMEN.

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THOUGH the following note refers to a subject which is by no means new, there seems to be too little stress laid upon certain normal differences which are apt to be observed between the urines of women upon the one hand and of men upon the other. When one is confronted in a case of examination for life insurance with a urine the specific gravity of which is 1040, one is at first inclined to think that the person who passed that urine must be abnormal, and not unnaturally one tests that urine with extreme care for sugar. The fact that specific gravities of 1035 or even 1040 may occur without there being anything the matter with the person at all is difficult to convince oneself of, until one has seen a number of cases. Such cases, however, do not seem to be very uncommon amongst women. The following instances occurred in the course of examining 150 apparently healthy nurses. In no case was any sugar to be detected in the urine, either by Fehling's or by the phenyl-hydrazine test.

One obvious suggestion is that a high specific gravity of this kind must indicate that the person is drinking far too little fluid, and is therefore passing a very concentrated urine. This is doubtless true to some extent, but it is not entirely true that if a woman drinks a normal amount of fluid per diem she will necessarily have a urinary specific gravity of 1025 or less; for whenever a nurse has been found to have a specific gravity at first examination of over 1030, she has been urged to drink fluids to the extent of at least three pints per diem, and the fluid taken daily has been observed by the sisters in the Nurses' Home. Sometimes the specific gravity of the urine has fallen at once, but by no means always has it become as low as one might have expected. That there was really no disease in these cases has been confirmed by their subsequent course, the nurses in question having remained perfectly well.

Urinary specific gravities of this kind do not occur to any similar extent, I think, amongst men; but, particularly from the point of view of life insurance, it is worthy of note that a specific gravity even up to 1040 is by no means necessarily an evidence of ill health in a woman. It might be added that in the earlier cases it was thought that there must be some error in the recording instruments; but this source of fallacy was excluded by the use of several different urinometers, each of which was tested separately; all recorded similar results for the same urine.

The following cases indicate that it is by no means in hot summer weather only that the high specific gravities occurred:

NURSE LO.

Date of Observation.	Sp. Gr. of Urine.	Date of Observation.	Sp. Gr. of Urine.
September 6th	*1040*	February 22nd	*1040*
September 20th	*1040*	May 12th	*1036*
September 30th	*1036*	May 25th	1030
October 14th	*1034*	July 28th	*1044*
October 29th	*1040*	October 7th	1030
November 1st	*1040*	October 29th	*1034*
November 19th	*1034*	December 10th	*1032*
December 3rd	*1036*	February 4th	*1034*
January 20th	1028		

NURSE HW

September 10th	*1038*	May 11th	1030
September 15th	*1036*	May 25th	*1035*
September 30th	*1036*	June 17th	1028
October 14th	1030	June 26th	1030
October 29th	1030	July 28th	*1034*
November 1st	1030	August 16th	1020
November 19th	1024	October 7th	*1035*
December 3rd	1025	October 29th	1030
January 31st	1030	December 10th	*1034*
February	1030	February 5th	*1031*
March	*1032*		

NURSE MY.

November 1st	*1040*	May 11th	1025
November 19th	1015	May 25th	1030
December 3rd	1030	July 28th	1028
January 31st	1015	October 7th	1018
February 14th	1028	October 29th	1020
February 21st	1024		

NURSE SP.

November 21st	*1034*	February 14th	1020
December 3rd	*1038*	February 21st	1020
January 31st	*1034*	May 11th	1024

NURSE CA.

November 20th	1030	May 11th	1020
December 3rd	1030	May 25th	1028
January 31st	1025	June 12th	*1034*
February 14th	1020	June 26th	1025
February 21st	1020	August 12th	1020
June 17th	*1040*	October 30th	1020
July 28th	1026	February 5th	1024

NURSE RE.

November 20th	*1032*	May 26th	1010
December 3rd	1028	June 26th	1020
February 7th	1030	August 12th	*1034*
February 24th	1030	February 5th	*1033*
May 12th	1012		

NURSE LA.

December 6th	*1040*	June 12th	*1035*
February 21st	1010	June 30th	*1034*
March 19th	1030	July 28th	*1035*
April 17th	*1038*	August 16th	*1035*
May 12th	*1035*	October 30th	1025
May 26th	*1038*	March 30th	1025

NURSE PR.

January 17th	*1034*	August 16th	*1032*
February 27th	*1035*	February 3rd	1024
May 26th	*1035*	March 30th	1028
July 28th	*1035*		

NURSE MU.

Date of Observation.	Sp. Gr. of Urine.	Date of Observation.	Sp. Gr. of Urine.
April 24th	*1040*	August 12th	*1032*
May 12th	*1032*	October 7th	*1035*
June 12th	*1036*	December 10th ...	1028
June 28th	1030	February 5th	*1034*
July 28th	*1035*	March 30th	1027

NURSE IL.

October 13th	*1033*	February 5th	*1034*
October 30th	1020	March 30th	*1033*
December 10th ...	*1035*		

NURSE MA.

June 12th	*1035*	October 7th	1020
July 28th	*1035*	October 30th	1024
August 12th	*1035*	December 10th ...	1020

NURSE WA.

June 12th	*1036*	August 12th	*1035*
July 28th	*1040*		

NURSE NE.

June 12th	*1035*	October 7th	1024
June 28th	*1040*	October 29th	1020
July 28th	*1034*	February 5th	1024
August 12th	*1035*		

PARTIAL GASTRECTOMY FOR GASTRIC CARCINOMA: RECOVERY.

By H. BETHAM ROBINSON, M.S.LOND., F.R.C.S.,
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ATTENTION may be drawn to the features presented by the growth in the following case, and by the treatment adopted.

1. The growth was very limited, and the glandular involvement slight. This allowed of removal of both with a fairly wide margin. The tendency of a growth is to spread particularly towards the cardiac orifice, thus it is important to have a wide margin on this side. The section of the stomach corresponded pretty well with the incision used by Mikulicz—that is, from just to the right of the cardiac orifice almost vertically downwards to the great curvature. The glands were quite soft, and did not suggest involvement. The lymph stream from the glands at the great curve passes to glands about the head of the pancreas, and there no enlargement could be detected.

2. An end-to-end junction after Billroth's method was used, as the cut edges could be easily brought into apposition. No after-trouble was experienced from leakage, the occurrence of which has led to the advocacy of other methods.

3. The character of the growth was a colloid carcinoma, and the probably lessened degree of malignancy leads one to hope for a permanent cure.

The patient, a bricklayer's labourer, aged 60, was admitted into hospital under the care of my colleague, Dr. Sharkey, on June 18th, 1908, complaining of pains in the abdomen, sickness, and loss of weight during the preceding twelve months.

He had a fresh complexion and looked healthy; his general nutrition was good with no marked evidence of wasting. There was no history of syphilis, and he was a moderate drinker and smoker; of late, however, smoking seemed to increase his symptoms.

History.

Twelve months before he began to complain of a slight gnawing pain in the upper part of the abdomen, but it was not until four months later that it gave him any serious inconvenience. Then he had pain at different times of the day, which might last from a quarter to two hours at a time, and was relieved on taking food, even if its amount was very small. For the last two months or a little more he had vomited, generally in the evening after his meal; he had brought up a lot of clear, watery fluid at times, which was often followed by vomiting. During the same period he had been very constipated. His appetite had become very poor, and he thought that recently he must have lost about a stone in weight.

Condition on Admission.

Examination gave no evidence of any disease. The abdomen moved well with respiration; there was no distension nor was there any tumour to be felt. There was some tenderness on deep pressure behind the upper part of the right rectus and a little increased resistance here. His tongue was clean and his urine was normal. The stomach was not dilated, showing absence of pyloric obstruction, and a test meal given on two occasions showed no free hydrochloric and no lactic acid to be present.

Operation.

He was transferred to my ward, and on July 8th I operated. An incision was made to the left of the mid line dividing the rectus sheath and reflecting the muscle. There were no adhesions about the stomach and adjacent structures; the stomach was withdrawn through the wound, and on palpation a lump was felt in the posterior wall. Clamps were placed on the stomach just to the right of the cardiac orifice and on the first part of the duodenum, and this area was packed off with gauze from the rest of the abdomen. An incision in the length of the stomach was made through the anterior wall over the lump, and the posterior wall was extruded through this hole. The lump was a circular flattened growth with hard edges, about the size of a four-shilling piece, and was placed nearer the lesser curvature in the middle of the right third of the stomach; the mucous membrane over it was reddened, but there was no ulceration. There was an enlarged gland felt at the lesser curve about 1½ in. from the pylorus, and another at the same spot at the greater curve; both, however, felt quite soft. No other enlarged glands could be detected. After dividing the gastro-hepatic and gastro-colic omenta wide of the glands and tying off the vessels, the portion of stomach and pyloric region between the clamps was removed. An axial anastomosis was made, the duodenum being joined to the upper part of the stomach wound by a continuous catgut and interrupted silk Lembert stitches; the lower part of the stomach was closed in the same way. There was a little trouble from haemorrhage into the gastro-colic omentum from a ligature slipping, but otherwise there was no difficulty. The abdominal wall was closed in layers. There was some shock at the end of the operation, but not sufficient to demand infusion; he was given 10 oz. of normal saline with ½ oz. of brandy by rectum, and this was repeated every four hours during the first night.

After-history.

The after-history was quite uneventful, and may be said to have given no anxiety. The next morning he was put on a teaspoonful of water by mouth at intervals and ordered a nutrient enema of dextrose and sanatogen, each 20 grams, in 15 oz. of saline, to be given alternately with the same quantity of saline every six hours. On the 10th the quantity of water by mouth was increased, and on the 11th he was allowed two teaspoonfuls of Brand's essence thrice in the day. Sanatogen in water was added on the 13th, and on the 15th he had whey; on the 17th egg-flip was given. On the 18th all rectal feeding was stopped, and junket, Benger's food, bread-and-milk were allowed, but no feed was to exceed 5 oz. Soft, thin bread-and-butter was added on the 19th, and on the 22nd he was on minced fish. Food now gave him no discomfort. His abdominal wound healed by first intention.

The growth proved to be a colloid carcinoma of the spheroidal-celled type.

The man has been frequently seen by me since the operation, and he has put on weight and remains free from symptoms.

A CASE OF VIPER OR ADDER BITE (VIPERA BERUS).

By R. S. C. EDLESTON, M.R.C.S., L.R.C.P.
BASLOW, DERBYSHIRE.

ON Thursday, August 5th, at 5 p.m., I was called to see Dr. H. Peck, Medical Officer of Health of the Chesterfield District of Derbyshire, who, I was informed, had been bitten by an adder near the reservoir on the Duke of Rutland's moor at Ramsley, on the high ground north of Baslow. He had been testing water for peaty acids, and seeing a snake in the grass he picked it up, thinking it was a common grass snake. The snake immediately struck him. I found when I reached Ramsley Lodge at 5.30 p.m. that the bites had been inflicted about 2.30 p.m. The doctor described his experiences as follows:

"I picked up the snake, and he struck me first in the right thumb and hand and then on the left hand. I immediately killed the snake and sucked one of the wounds, probably that of the left thumb first. Almost immediately I began to feel a tightness of the brow, as though a knotted handkerchief had been tied firmly round the head. I removed my hat, but the sensation continued. I became faint, and very soon vomited. The feeling of faintness continued to increase, the lips and tongue and fauces began to swell, and I had great difficulty in getting my breath. I made my way as well as I could, with frequent rests, towards the keeper's lodge, and was finally assisted there by the keeper and his wife."

When I arrived Dr. Peck was in bed, and between repeated attacks of vomiting he told me, as well as he could, what had happened. He appeared to be extremely exhausted. I examined the wounds, which were little more than pricks of the skin, but the right thumb was slightly swollen and bruised; I squeezed out anything I could with firm pressure around them, applied ammonia, and washed them with strong carbolic lotion. Seeing that the bites had taken place some three hours previously, and having regard to the extreme state of collapse, I did not think much could be done by local treatment, and turned to an examination of the general condition. The face and head were bluey-black in colour, and the lips swollen and cyanosed; the pulse was not perceptible at the wrist, neither could I hear the heart sounds. The skin was bathed in perspiration and quite cold, and yet the patient could not bear to be covered. Stimulants were not available when he arrived at the house, but some brandy had been procured and he had had some. More brandy and 2 drachms of aromatic spirits of ammonia in water were given. I injected $\frac{1}{50}$ grain digitalin and $\frac{1}{50}$ grain strychnine; there was some response to the drugs, but not much, so in half an hour I repeated the dose; in the meantime hot bottles were placed to the feet and a large piece of blanket wrung out in very hot water applied all over the chest and abdomen. Dr. Peck was then complaining of pain in the splenic region and also over the bladder. Vomiting was incessant and was followed by violent diarrhoea with strangury, but no urine was passed, though there was frequent desire to micturate. Asked how he felt, he replied "Awful"; he could not describe the sensation. He was extremely restless, constantly throwing off the bedclothes, and complaining of feeling smothered, yet the skin was quite cold and clammy. He stated afterwards that the intense restlessness was due to hyperaesthesia of the skin, so that he could not find a comfortable position.

At 7.45 p.m. I left him somewhat better, and went up to see him again at 9.30; the vomiting was still persistent, and the pulse had become very weak, and could with difficulty be timed about 130. I gave another injection hypodermically of digitalin $\frac{1}{50}$ grain and strychnine $\frac{1}{50}$ grain, applied the hot-water pack to the abdomen again, and renewed the hot-water bottles to the feet.

I left him at 10.15 p.m. rather better. I took with me a mixture of liq. bismuthi ʒj, tinct. nucis vom. ♏xl, tinct. strophanth. (Professor Fraser's revised formula) ♏xl, acid. hydrocyanici dil. ♏xvj, aq. ad. ʒviij, which I directed to be taken every three hours.

The following morning, when I took Mr. E. M. Wrench up with me to see him, he appeared much better; his pulse was then 120, respirations normal, and heart sounds definitely heard, though muffled. The right arm was now greatly swollen and discoloured up to the axilla and extending on to the chest, back and front. The left arm was not swollen, but there was a bruised appearance about the bite on the thumb. The temperature was still subnormal—95° in axilla and mouth. Dr. Gordon Shea, of Chesterfield, saw him with me at 1.30 p.m. He took a very grave view of the case, and agreed that Mr. Sinclair White, of Sheffield, should be asked to see him. Mr. Sinclair White, who arrived at 4 p.m. on August 7th, took a more hopeful view, though he found the whole of the right upper limb still much swollen. The swelling, which was for the most part a firm oedema, extended on to the chest and down over the abdomen, and also on to the back. The skin of the upper arm on the inner side was flushed, and the wounds were surrounded by inflammatory areas, but the limb was generally pale and cold to the touch; the hand was much swollen and could not be closed, and the extensor aspect of the fingers had a greyish-purple tinge. The fear that some sloughing might ensue could not, therefore, be entirely set aside. The wound on the left thumb was surrounded with ecchymosis, but there was little or no oedema. On August 8th, at 10.20 a.m., the discoloration had assumed the appearance of a large bruise, and extended over the greater part of the right side of the back nearly to the spine, and on its posterior aspect the arm presented a raw-beef appearance; the pain was less, and the general condition of the patient improved, though he had passed a restless night. More nourishment had been taken, and the temperature had risen to 97.4°; the pulse was 120, and its volume and tension had improved. A muffled systolic murmur could be heard at the apex of the heart, and extended towards the axilla. The vomiting had almost ceased, but occurred once during the night and once during my visit. Mr. Sinclair White and Mr. Wrench saw him again with me at 1.30 p.m., and agreed that the immediate danger was passed.

On August 9th the pulse was fallen to 100, the volume and tension improved, and the temperature had reached normal. A greenish discoloration had appeared on the left arm in the line of the lymphatics. On August 10th the pulse was 88 and the temperature normal; the discoloration of the left arm extended to the shoulder, but was fainter in colour, though still distinctly visible. The right arm and hand were decidedly less swollen, and the patient's general condition much improved. On August 11th the discoloration on the left side, though if anything more faintly green, now extended across the front of the chest in the mammary region, and joined up with that on the right side, showing the anastomosis of the lymphatics across the chest.

On August 12th the discoloration of the left arm, though still visible, was gradually fading. Dr. Peck was so much better in himself, though the right arm was still discoloured and swollen, that I allowed him to be removed to his home in Chesterfield. He bore the journey well, and on the following day was able to use the fingers of the right hand for turning over the leaves of a book. There was little pain in the arm, and there had been no sloughing. I visited Dr. Peck again on August 15th, when his general condition was good, and that of the heart had much improved, the murmur being fainter and the apex beat quite definite and in the normal position. Two days later the patient was examined by Drs. Shea and Booth, who found that the murmur did not then occur with every beat. The arm had not returned to its normal size, but the ecchymosis had entirely disappeared. The distance between the insertions of the fangs in the three wounds appeared to vary from $\frac{1}{4}$ to $\frac{3}{8}$ in. On August 22nd the swelling of the arm was reported to have practically subsided; he still had some pain in the hand, and the skin of it was desquamating.

SEVENTY-SEVENTH ANNUAL MEETING

OF THE

British Medical Association.

Held at Belfast on July 23rd, 24th, 26th, 27th, 28th, 29th, and 30th.

PROCEEDINGS OF SECTIONS.

SECTION OF PSYCHOLOGICAL MEDICINE.

T. OUTTERSON WOOD, M.D., President.

PRESIDENT'S INTRODUCTORY REMARKS.

AFTER some preliminary observations, Dr. Outterson Wood said: At one time the study of mental diseases was looked upon as something apart from the subjects considered necessary in the medical curriculum, and I well remember the almost exclusive nature of the study of psychological medicine when I first became connected with asylum work, over forty years ago Fortunately for us, and for our status in the profession, the subject is now taught and included as a compulsory subject in all examinations for qualifications, and a glance at the agenda of our work in this Section will show how we are now working more closely in touch with the principles of general medicine. The fact of our having a Section assigned to us for the consideration of the more purely medical subjects connected with asylum practice in this great medical association cannot fail to be advantageous to the study of mental diseases, and tend to keep up the medical spirit in asylum work. The promotion of

a closer connexion between neurology and psychiatry is a matter well deserving our attention. There can be no doubt that in practice there is considerable overlapping in these subjects, and it may well be worth while considering the advisability of extending the scope of the work of our Section so as to include these two kindred subjects; for there is in the study of insanity (quite apart from asylum administration) so much work of a purely medical character which trenches closely upon, and in many instances includes, neurological problems, that it might well be to the mutual advantage of the students of both to have the two subjects combined in a Section of Psychiatry and Neurology. I trust that before we conclude the work of our Section this subject may be brought forward for discussion,[1] so that we may obtain the views of our members upon it.

DISCUSSION ON THE SUPERFICIAL AND DEEP REFLEXES.

OPENING PAPER.

By John M. MacCormac, M.D., L.R.C.P.and S.Edin.,
Physician, Belfast Hospital for Diseases of the Nervous System.

I have to ask you to study with me a subject which, so far as I am aware, has not received attention in this country. It is that of the superficial and deep reflexes as an additional means in the diagnosis of the principal forms of mental disease. The conclusions I have arrived at after careful observations for many years are much in harmony with those of Agostini.

Crossing of the Patellar Reflex.

If the patellar tendon on one side be struck, the opposite leg will be adducted, mainly by the action of the crureus and vastus internus, which muscles are seen to contract even when the movement is slight. This patellar jerk is a true reflex, and I have observed that in certain forms of sclerosis of the spinal cord a slight percussion will cause the knees to knock together, and at the same time the arms are adducted. These actions soon lessen and pass into a state of tremor, which gradually disappears.

Modifications of Reflexes.

My observations on the superficial and deep reflexes in their relation with the modification of painful sensibility in mental disorders have shown me that it is possible to establish some formulae which correspond in a general way to the state of the reflexes in each of the principal forms of mental disorder, and which in consequence are not without value in the diagnosis of these affections.

General Paralysis of the Insane.—In this disease the condition of the reflexes varies according to its stage. In the initial stage there is generally a weakening of painful sensibility and of the cutaneous reflexes, with the exception of the plantar reflex. On the other hand, the deep reflexes are exaggerated. In the second stage of the disease the plantar reflex is very markedly exaggerated, and in all other reflexes both deep and superficial are increased, the tendon reflexes being still more marked than in the first stage. In the third stage all the reflexes become weaker until they finally disappear.

Epilepsy.—During an epileptiform attack the superficial reflexes are decreased or abolished, but the tendon reflex is exaggerated, and often accompanied by fibrillary contractions which may be transmitted from a limb to the trunk, and then may pass to the limbs of the opposite side. In epileptic insanity sensibility to pain, as well as the reflexes produced by stimulation of the skin and mucous membranes, are generally lessened. The tendon reflexes, on the contrary, are normal.

After some convulsive attacks the tendon reflexes are increased, whilst the cutaneous reflexes are considerably weakened, with the exception of the plantar reflex, which is augmented, and may be associated with trembling or even with epileptoid movements of the foot.

Neurasthenia.— Hypochondriacs and neurasthenics generally present an increase of all reflexes, both superficial and deep.

In *hysteria* there is a decrease of painful sensibility and of the cutaneous reflexes.

In *alcoholic paralysis* painful sensibility and tendon reflexes are exaggerated, whilst the cutaneous reflexes (except the plantar reflex) are weakened.

In *acute mania* the reflexes are normal.

In *secondary dementia* all reflexes are exaggerated.

In *melancholia* painful sensibility and cutaneous reflexes are normal, whilst the tendon reflexes are exaggerated. In the stage of melancholic stupor painful sensations, which on superficial examination may appear feeble, are in reality normal; the cutaneous reflexes are feeble; the tendon reflexes are exaggerated.

From these statements we see how very differently tendon reflexes and cutaneous reflexes act, and this we can understand when we consider that the two acts of reflexes are represented in the spinal cord by separate systems, one of which may be affected while the other remains normal.

DISCUSSION.

Dr. R. H. Cole (London) considered that the reflexes varied in an inexplicable manner both in the sane and the insane. He instanced the fact that the patellar reflex was entirely absent in some persons without any trace of disease. He agreed that this reflex was exaggerated in the early stages of the expansive form of general paralysis and absent in the tabetic and peripheral forms of that disease. The loss of the plantar reflex he regarded as highly pathognomonic of hysteria.

Professor C. H. Hughes (St. Louis, U.S.A.), who referred to Dr. MacCormac's contribution as a valuable and timely paper in the line of symptomatology and diagnosis and the beginning of illuminating research, said that the relation of cerebral states to reflex phenomena was universally recognized in the profession in hysteria. The value of their modification was also recognized in neurasthenia, psychasthenia, etc., and in peripheral or polyneuritis. Eulenberg, he believed, first called attention to the absent patellar tendon reflex in locomotor ataxia or posterior spinal sclerosis. This authority (Eulenberg) was inclined to ascribe to this phenomenon a too exclusive diagnostic value, overlooking, the speaker thought, the phenomenon of absent reflex in chronic polyneuritis. But later he extended his views on this important subject. On the whole, there was still a wide and open field for the study of the reflexes in relation to cerebral states.

Dr. A. T. Schofield (London) said that it would be interesting to know if the reflexes varied in the extreme manner that had been noted by the asylum doctors who had spoken in the case of spinal diseases in the sane. It seemed from the remarks of Dr. Hughes that there was a possible connexion between cerebral action and special reflexes, and if that were so they should expect their reflexes to differ in the sane and insane. He was very glad to note the difference recorded in the reflexes of hysteria and neurasthenia, as he held strongly that there was a fundamental difference between these two in their etiology and symptomatology, and that, while hysteria was a true disease, neurasthenia was essentially a condition of exhaustion of the cerebral or spinal centres, or both.

Dr. David Blair (Lancaster) said that his experience was that abnormalities of the superficial and deep reflexes in various forms of insanity were by no means constant. They were often evanescent. It was not only one reflex that might vary, but symptoms sufficient to produce the complete picture of a well-known nervous disease would last for a time and then disappear. Thus a patient might one day present an almost complete picture of lateral sclerosis or disseminated sclerosis, while a few months later no such diagnosis could be made. Of late years there had been a disposition to ascribe these abnormalities simply to some invasion of hypothetical toxins, and to suppose that the symptoms disappeared when these receded, but he could not say that these abnormalities had up till now been reliable symptoms of forms of mental disease.

Dr. MacCormac, in reply, said that he did not intend to put his observations forward as finally dogmatic, but rather as furnishing additional means of diagnosis. It was possible that the particular reflex phenomena that he had mentioned might not always be present, but he was convinced that they were to be found in almost all the mental diseases to which he had referred. His observations had

[1] The Section eventually passed certain resolutions, copies of which found on pages 671 and 672.

been confined in the main to the onset and early stages of insanity. The fact that the phenomena mentioned did appear in the very early stages had impelled him to the conclusion that there existed in the brain a hereditary and morbid physiological basis for the insanities; and that somatic diseases, apart from the nervous system, did not produce, but might stimulate, the latent physiological conditions in the brain to action, and these result in insanity.

SOMATIC DELUSIONS AND LOCAL LESIONS.

By C. A. MERCIER, M.D., F.R.C.P.Lond.,
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THE nature of the case on which I am about to comment will be sufficiently gathered from the following account of its more important features:

Clinical History.

The patient was a clerk, aged 36, who had a persistent delusion that his bowels were stopped, and that nothing ever passed through them. He met every inquiry respecting his health with the complaint that "he could get nothing through him." He frequently refused food, on the ground that it would never pass from him, and he was "already bunged up with victuals." In fact, his abdomen was shrunken, and his bowels were moved several times a week. An occasional dose of castor oil never failed to produce a lax motion of sufficient quantity; but, when this was shown to him, he declared it was nothing, and that he never got anything through him.

This was his most prominent and often expressed delusion, but he had apparently one other—that he had been ravished per rectum by a Frenchman. Whether this was a delusion, or whether it had any foundation in fact, could not be certainly ascertained, but it was assumed with every probability to be a delusion for the following reasons: When he made the assertion, he made it at the same time, and in the same lugubrious and despairing tone, that he spoke of the obstruction of his bowels; he connected the two things together, and attributed the obstruction to syphilis acquired from the Frenchman in the manner indicated; he was a man of cleanly life and conversation, not in the least likely to have been a consenting party to such a transaction, and without his concurrence it would of course have been impossible; and he gave no particulars of time or place at which the assault had occurred.

These statements he continued to make for years. He occasionally did a little work, but for the most part he spent his time brooding over his misery. He often refused food; and had to be urged, and at length compelled, to take it.

As he became thinner and thinner, in spite of copious feeding, his chest was examined, and the whole of the left side was found to be non-resonant, with other signs of consolidation. His temperature, however, was not raised; he had no cough; he never complained of pain in the side; his breathing was not accelerated while he was at rest; he had no night sweats; and, beyond the physical signs, there was nothing to point to lung disease. The right side of the chest was over-resonant, and its free movement contrasted with the restricted movement of the left. He became thinner and weaker, and at length died, greatly emaciated, and apparently of exhaustion, after an illness of more than two years' duration.

Post-mortem Findings.

At the *post-mortem* examination the stomach and duodenum were found healthy, but along the course of the jejunum several of the solitary glands were seen to be enlarged, congested, prominent, and succulent-looking, projecting as dark red nodules above the surface of the mucous membrane. On tracing the course of the gut downwards, larger and larger nodules were found, more congested and more jellylike in appearance. About the middle of the jejunum was found one with the summit eroded, so that it formed a shallow ulcer with inverted edges, whose floor was above the general surface of the intestine. Following the gut down, other ulcers were found, becoming larger and deeper, till they extended, the earlier ones to the muscular coat, the lower to the serous coat of the bowel. All were of the same circular form; all of about the same size; and the bases of all, save those whose base was the peritoneum, were deeply congested. The lowest and largest of these ulcers, which had attained the size of a sixpence, penetrated completely through the wall of the intestine, and had allowed its contents to escape into the peritoneal cavity, setting up acute peritonitis over the lower half of the abdominal cavity. The ileum was not much affected, though here, too, the solitary glands were enlarged. The whole of the large intestine was normal, with one exception. On the posterior wall of the rectum, about 4 in. above the anus, was an ulcer of irregular shape, whose total area might have equalled that of half a crown. Its surface was coarsely granular, the granules presenting the unmistakable appearance of grey, that is of recent, tubercle. Its edges were thickish, and moderately firm.

The structure of the liver appeared normal, but behind and below the posterior border of the right lobe was a spherical tumour the size of a cricket ball, enclosed in a thick glistening capsule resembling the tunica albuginea. The surface of the tumour was everywhere free, except where it adjoined the liver, to which its capsule was closely attached. On cutting into it its contents were found to resemble cream cheese.

The left lung was consolidated almost throughout, and was riddled with small cavities. The right lung was emphysematous, and within its soft and downy texture could be felt many sharply limited nodules, from the size of a pea to that of a kidney bean, which displayed the characters of boiled-rice tubercle.

The brain and other organs appeared normal.

This case is a good instance of the difficulties that attend the recognition of bodily disease among the insane. One lung was consolidated, riddled with cavities, and completely adherent to the chest wall: yet the patient was never known to cough; his temperature was not raised; he never complained of pain in the chest; he had no sweats; and his breathing was not noticeably accelerated. There never was a local symptom to attract attention to his lungs; and, if his chest had not undergone routine examination, the lung disease would never have been suspected during life.

So, too, he had perforating ulcer of the small intestine, allowing the escape of faecal matter into the abdominal cavity, and setting up peritonitis, of which he died; yet he never once complained of pain in the abdomen; there was no tympanites, his belly being, on the contrary, greatly sunken; and he had a copious natural motion the day before he died. The character of his delusions and the decided abdominal facies that he had for weeks before his death, led to an expectation that some abdominal lesion would be found *post mortem*, but there was nothing to indicate what the nature of this lesion was likely to be.

There can be little doubt that the character of the delusions was connected in some way with the seat of the local lesions. The delusion that his bowels were obstructed corresponded with the fact that the bowels were the seat of manifest disease—disease which was the immediate occasion of his death. The delusion—if, as there can be little doubt, it was a delusion—that he had been raped per rectum, corresponded with the existence of a large ulcer in the rectum. The double connexion between delusions referred to two separate parts of the body and ascertained disease in those two parts of the body compels the conviction that there was a causal relation between the local reference of the delusions on the one hand, and on the other, the existence of disease in the parts of the body to which the delusions referred. The nature of this causal connexion is by no means clear.

A very crude hypothesis, but one that I have known to be advanced, is that the bodily disease was the cause of the delusions. If this is translated into precise terms, it means that the existence, seat, and nature of the bodily disease determined the existence and nature of the delusion, in such wise that if there had been no disease of the bowel, there would have been not only no delusion referred to the bowel, but no delusion at all. Few, I think, would adhere to this hypothesis when thus explicitly stated. The lung was much more completely diseased than the bowel; yet there was no delusion referred to the lung; and ulceration both of the small and the large intestine is frequent enough without any concomitant delusion. Clearly, therefore, something more than ulceration of the bowels is necessary to account for the existence of delusion having reference to the bowels.

A less crude and more plausible hypothesis, and one that naturally suggests itself, is that the coenaesthetic sensations from the diseased bowel determined the localization or local reference, and the character of the delusion, of a person whose mind was already so disordered that he was sure to entertain delusion of one character or another. According to this hypothesis, the pre-existing disorder of mind ensured the occurrence of some delusion, and the local disease determined the particular character of these delusions by directing their reference to the diseased organs. This hypothesis is much more plausible, but it involves considerable assumptions, and is scarcely to be accepted without further consideration.

Many insane persons are the subjects of gross disease in one organ or another, and yet how rare it is for this gross disease to influence their delusions so as to give the delusions a reference to the diseased organ! In this very case, the lung was far more diseased than the bowel; and with a disease which, if appearances may be trusted, was of far longer standing; and yet there was no reference of the delusion to the lung. There was a large abscess, which

had probably been at one time active, behind the liver; and yet there was no reference of the delusion to liver or loin. If it is suggested that delusions are not influenced by local disease unless the local disease is in existence at the time the delusions are incubating, the difficulty is not removed, but increased. The delusions had existed for at least two years. The abscess was certainly of very long standing. The dense fibrous tissue of its capsule must have taken a very long time to form. But may it not be that it needs active disease as the time delusions are incubating to determine the reference of the delusion to the seat of the disease? Such a hypothesis may well account for the failure of the hepatic abscess to colour the delusion, but it will not account for the failure of the tuberculous lungs to do so. The disease in the lungs was in a very active phase at the time of death; and it had been active for a long time before, for there was every stage of disease from grey gelatinous tubercle, through boiled rice and caseous tubercle to cavities as large as a small walnut. The delusions had existed for at least two years, but the intestinal disease had certainly not existed for two years. It is doubtful whether the jejunal ulcers had been in existence for two months. The solitary glands in which they were formed were soft, succulent, and translucent. Their margins were neither thickened nor pigmented. They had all the marks and appearances of recentness. The rectal ulcer may have been of older date. Its margins were a little thickened. But it was not deep, and its base was formed of grey, translucent tubercle. Whether we suppose that long-existing disease only, or recent disease only, can colour delusions, the facts are equally against us.

There is yet another possible connexion of causality between the delusions and the intestinal lesions—one which may seem at first sight far-fetched and improbable, but which, when examined, appears to fit in with the facts better than either of the preceding. I have often insisted on the existence of a trophic function of the cerebral convolutions, and on the disturbance of metabolism, sometimes widespread and shallow, sometimes restricted and profound, that attends that disorder of the function of the convolutions which is otherwise manifested in insanity. I have watched insane persons starve to death in spite of being fed abundantly and superabundantly—starve from incapacity of the tissues to assimilate the nourishment so copiously supplied to them. That the tissues and not the digestive tract were in fault, is shown by the normal amount and quality of the urine. The disorders of the metabolism of the skin and its appendages, which are so frequent in chronic insanity, are matters of common knowledge and frequent comment. As I am constantly reiterating, observable disorder in insanity is threefold: disorder of conduct, disorder of mind, disorder of metabolism; but these three disorders are seldom proportionate to one another. One usually preponderates; often one only can be identified. In moral insanity, disorder of conduct alone appears, and neither of intelligence nor of metabolism is there discoverable anomaly. In simple melancholia, in claustrophobia, there is disorder of mind alone, and neither disorder of conduct nor of metabolism can be observed. Disorder of metabolism, if it occurs alone, is not regarded as, or associated in our minds with, insanity, but there are cases of insanity in which disorder of metabolism rises into equal prominence with disorder of mind and of conduct. Such are the cases of the insane who die of starvation while overfed.

The metabolic disorder in insanity has not always this diffused, general, and universal character. It is often localized—sometimes strictly localized. It is often manifested in the skin alone, or in the appendages of the skin. We see it in some cases in a striking alteration in the hair. I have recorded a case in which all the nails were shed, of both fingers and toes, after an attack of acute insanity. In another case, the gastric secretion was so horribly foul that, when the stomach was washed out, the stench pervaded the whole institution, and rendered it almost untenable. These disorders of metabolism, local as well as general, are not extrinsic complications, accidentally accompanying and mingling with the insanity. They are as much and as directly due to the deranged function of the convolutions, as are the disorders of mind and of conduct. They are an integral part of the disease; and the whole three disorders, of mind, conduct, and metabolism, together make up the clinical picture of insanity.

That the nutrition of tissues may be seriously disturbed by disorder of the ganglia from which their nerve supply issues, is a commonplace of pathology. To such disordered nerve supply is due the eruption of herpes. To such disorder is due the acute bedsore of spinal disease. To such disorder is due the painful, glossy skin, and other disturbances of the nutrition of hemiplegic limbs. Every one admits the trophic function of the lowest and the middle ranks of nerve centres. My contention is that a corresponding function is exercised by the highest centres also.

That the patient was insane is evidence that the function of some part of his cerebral convolutions was deranged. That his delusions had direct reference to his bowels is evidence to my mind that the derangement affected with greater severity that portion of the convolutions in which the bowels are prominently represented.

I assume, following Hughlings Jackson, that in every part of the convolutions the whole body is represented, but that it is not uniformly represented. In one place, one part—the arm or the leg—has, we know, the predominant representation. In another place, another part—the retina, or the musculature of the eye—is predominantly represented. In a third area, it is to be supposed, though it is not yet proved by the labours of localizers, that there is predominant representation of the viscera. And our localizers have taught us more than this. They have shown that in the arm area is one part in which one set of arm muscles is predominantly represented, and another part in which the predominant representation is of another set of arm muscles; and so with the muscles of the leg and mouth and eye. It is not stretching analogy or conjecture very far to suppose that, in the area in which the viscera are represented, they are represented unequally, one viscus having predominant representation in one part of the area and another in another.

I take it that in the case of this patient the area of convolutions that was most gravely disturbed in function was the area in which the viscera are represented; and that the derangement lay with special stress upon that portion of the area of visceral representation in which the bowel is predominantly represented. This inference seems to be justified by the local reference of his delusion. The derangement of function did not spread widely beyond this area, for there was no disorder to speak of, either of mind or conduct, beyond that which had reference to the bowel. The patient was able to pursue his occupation capably until his attention became so absorbed in his imaginary incapacity, to procure an action of his bowels, that he had no attention, thought, or interest to spare on any other subject; but neither conduct nor mind were disordered in any other respect than his absorption in his imaginary woes, and his neglect of all other interests. To this particular area of the convolutions, then, the gravamen of his disorder seems to have been limited.

The hypothesis that most commends itself to my mind is that the structural disease of the bowel was secondary to, and consequent upon, the derangement of function of the cerebral centre in which the bowel is predominantly represented. The character and limitation of the delusions is strong evidence that this part of the convolutions was most affected—was perhaps solely affected. There is abundant evidence that disorder of function of a nerve centre may cause disorder of the nutrition of the parts represented in that centre. I suggest that, in consequence of the disorder of the cerebral centre in which the bowel is represented, the nutrition of the bowel was so lowered that it fell an easy prey to the tubercle bacillus, already present in abundance in the body, and that it was thus that the tuberculous ulcers of the jejunum and rectum were allowed to form. This is, it will be seen, the very reverse of the previous hypotheses. So far from the bowel lesion being the cause, or the determining condition of the delusion, I suggest that the brain disorder, which underlay the delusion, was the determining condition of the lesions in the bowel.

If this hypothesis is correct, ought we to find in every case of somatic delusion a local lesion in that part of the body to which the delusion refers? And is it a fact that such lesions are uniformly or usually found in such cases? The latter question must be answered in the negative.

Somatic delusion is not a frequent delusion, and when it exists it is not usually very prominent; it lasts for years, and opportunity for *post-mortem* examination is very infrequent. Several cases are on record of local lesions being found *post mortem* in the part of the body to which somatic delusions referred, but these cases are very few in proportion to the number of cases of somatic delusions that exist, some of which must come on the *post-mortem* table every year.

But an examination of the case here recorded shows that the existence of a local lesion in every case of this class of delusion is not necessitated by the hypothesis. The metabolism of the bowel being impaired by the impairment of its trophic nervous supply, the bowel fell an easy prey to the tubercle bacillus. That is the hypothesis: and it is manifest that the lesion required as much the existence of the tubercle bacillus, and its presentation to the weakened bowel, as it required weakness of the bowel for the tubercle bacillus to act upon. It was the quasi-accidental conjunction of the two factors that brought about the tuberculous ulceration. Take away the tubercle, and the lowered metabolism of the bowel was not enough to produce structural disease. Take away the lowered metabolism, and the bacillus was powerless to invade the normal bowel.

The fact that the lungs were saturated with tubercle, and yet there was no delusion referred to the lung, does not seem to me at all inconsistent with the hypothesis. The lung is the favourite seat of tubercle. In very many people little or no degradation of the metabolism of the lung is needed to render this organ vulnerable to the tubercle bacillus. It is not so with the jejunum or with the rectum. Tuberculous ulceration of the jejunum is extremely rare, and of the rectum very uncommon. These organs are highly resistant to the tubercle bacillus, and need some very special and unusual preparation to render them vulnerable. Even supposing that no organ can, until its metabolism is lowered and damaged, become a prey to the tubercle bacillus, it is certain that the failure or alteration of the nerve supply from the convolutions is not the only condition of such failure of metabolism; so that the absence of delusion referred to the lung does not in the least militate against the hypothesis. Upon the whole, it seems to me that no other hypothesis satisfies all the facts, and that this hypothesis, somewhat strange and repellent as we find it at first, does satisfy them all; and is not in any way inconsistent with our general knowledge of the operations of the nervous system. This, then, is the hypothesis to which I venture to commit myself.

DISCUSSION.

Dr. DAWSON (Dublin) said that the case was one of a state which all had seen, and was the more interesting on that account. The first theory, suggested only to be discarded, did not seem so absurd as Dr. Mercier supposed. There were cases of a delusional attitude of mind which might never become insane unless some strong determining incident occurred, and there was no reason why such incident might not be visceral. The disease of the viscera and of the lungs were not on all-fours, as lung disease, even in the sane, might exist for long without the knowledge of the patient, whereas intestinal disease produced effects speedily. The second theory was certainly correct in some cases—for example, that of a neuropathic man who became melancholic from other causes, and when in this state developed a delusion centering round a slight nasal deformity which pre-existed. Furthermore, atrophic function, even of the lower centres, was by no means proved, as it had been found that after disease of the spinal cord the nutrition of the lower parts of the body gradually recovered if the parts were protected, and, if guarded from mechanical injury, remained much as before. As concerned the higher nerve centres, a trophic function was an assumption only. If there were any truth in Professor James's theory, that the coarse emotions were really due to sensations from the viscera, that would also militate against Dr. Mercier's view of the interpretation of his case. However that might be, the paper would excite fresh interest in the investigation of such cases, and it was doubly to be regretted that he was not present to wipe away the difficulties which might be felt in accepting his views.

HEREDITY IN THE CAUSATION OF INEBRIETY.

By T. D. CROTHERS, M.D.,
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ALL practical students of inebriety, alcoholism, and the drink neurosis are astonished that the heredity of this form of disease should be questioned and denied. If it were a matter of theory based on laboratory reasonings, there might be some reasons for doubt, but as it depends specifically on clinical studies and observations accessible to every one, it is surprising that such evidence has not been considered in the discussions of this topic.

The facts of heredity observed in an investigation of the history of a single family, noting all the conditions and peculiarities that are transmitted from one generation to another, will shed more light on this subject than all the theories and speculations of the past. Such studies show a marvellous uniformity of cause and effect governed by laws little known, yet moving with the exactness and certainty of any other phenomena of Nature. It is the tabulation of these clinical facts, and a comparison of their similarity seen in parents and children and going down through the generations, that has proved the laws of inheritance. My purpose is to offer some additional facts on this subject, not exhaustive or outlining any new phase, but simply to confirm the conclusions of others, and, if possible, bring new interest for a more thorough clinical examination of the facts so accessible to every one.

In an experience of thirty-five years of constant care and treatment of inebriates I have studied and outlined the history of 4,400 cases. Some of these histories have been minute, others were general. These studies were begun when the physical causes of inebriety were denied, and only moral forces and conditions were recognized. These studies began with the histories of ancestors, their habits and living, and comparisons between the physical life of the parents and children, and the similar causes and physical conditions.

These studies brought out the startling fact of the exact reproduction in parents from their ancestors and down to their children of physical and mental conditions indicating great laws of evolution and devolution that control with startling exactness.

In a tabulation of some of the causes of inebriety, either as active or contributing factors, the ancestral history seems to throw more light on the etiological conditions than a study of the present state. In over 70 per cent. of inebriates whose history was tabulated, the ancestors drank spirits moderately or excessively. In 20 per cent. only were such histories negative, and disease, injury, shocks, strains, and infections the more active causes. In 5 per cent. starvation and poisoning were clearly exciting causes, and in the remainder the conditions were complex and often psychical. Of those whose ancestors showed defects due to, and associated with, the use of spirits, there were two distinct classes: one in which the parents and grandparents used alcohol continuously and to excess; the other in which the parents and grandparents suffered from other diseases, principally neurosis, and whose use of alcohol was not so prominent and more symptomatic.

The first group was called direct heredities, and over 50 per cent. were tabulated in this class. The children from these parents gave a history of severe diseases in childhood and general nerve defects, marked by low vitality, feeble resisting power, and slow recovery from ordinary diseases, with distinct entailments. Many of them were given spirits for the ailments of childhood as a medicine, and in some instances a distinct craving and pleasing effect followed. At puberty such children exhibited eccentricities, often marked precocity and genius, with intense mental activity, followed by profound exhaustion.

Spirits as a medicine for its supposed stimulant and tonic effects were found to be most grateful remedies. In others alcohol was not used in any way until later life, and then for some distinct purpose, such as exhaustion and strain, and its seductive effects were very marked. In a number of cases the impulse to use spirits broke out suddenly and led up to great excesses, then died out. This often followed exhaustion and physical depression. In these cases the effect of alcohol, as an irritant, excitant, and pleasant narcotic, was most profound. Both the

physical and mental impressions were permanent, and grew in intensity in later life.

Many of the facts showed that the children drank in very much the same way that the parents did, both as to time, conditions, and surroundings. Thus in a number of cases the drink impulse broke out about the same time of life in two or three generations.

Such persons were temperate, and lived normal lives up to a certain time, then suddenly began to use spirits to excess with or without any reasonable cause. In one instance the ancestors were midnight drinkers, seldom using spirits until this hour of night. The children followed the same custom.

In another family insomnia was a common disease, and after 40 every member became a drink and drug taker for this condition. In one instance, successive members of the family running through two or three generations only drank at holiday seasons. At other times they were comparatively temperate. Travel seems to have been the starting-point for the drink impulse. Thus the children of several generations, who were noted as total abstainers, after travel abroad returned with the beer and wine drinking habits, and quickly became inebriates. Those who remained at home continued temperate. In many instances the descendants followed the parents in using spirits on occasions of great emotion or excitement of any kind. At other times they were temperate. Atavism appeared in many families. It is computed that at least 10 per cent. of such cases were traceable to grandparents whose excesses were peculiar and marked. In most of these instances the parents were abstainers, and exhibited an aversion and immunity to the effects of alcohol, but their children drank in so pronounced a way, and under conditions so similar to their grandparents, that the connexion could not be mistaken.

There is a form of psychical heredity in which children from inebriate parents show marks of great excitement, which resembles intoxication, without having used spirits. Often such persons will become greatly excited from anger, sorrow, and other causes, and appear like persons intoxicated.

This indicates the transmission of certain peculiar pathologic conditions not understood at present. In a second class of indirect heredities or complex inebrieties there is the same startling transmission of mental and physical characteristics associated with the use of spirits. Thus parents who are consumptive, hysteric, or epileptic will have children who show marks of degeneration, and who use spirits and drugs with and without reason. In early childhood such children exhibit peculiarities, mental instabilities, morbid impulses with susceptibility to exhaustion, and great mental activity or dullness with wide extremes of emotional and morbid impulses. From this source frequently come epileptics, idiots, low-typed criminals. The dipsomanias, circular insanities, and epileptoid drink paroxysms appear. The degenerations marked by consumption, epilepsy, and alcoholism turn into a vicious circle, in which a great variety of neurotic and organic diseases appears.

Many children of inebriate ancestors die of consumption or develop epilepsy from the slightest causes, even where the parents recognize the degenerative tendencies and struggle hard to overcome them. Mental peculiarities break out which indicate the abnormalties. There is a large number of children whose ancestors were active business men, who used spirits in moderation or excess, and who not only transmitted to their children intense ambition and intermittent activity, but low vitality, diminished power of resistance to overcome, and pernicious habits or impulses that are wrong. Frequently such children are periodic drinkers, and in the free interval make great efforts to build up a degree of total abstinence that will prevent relapse. Evidently a convulsive condition of the nervous system is transmitted which gathers and breaks out at intervals.

The periodicity of the drink impulse is another unexplained phenomenon which appears very frequently. While it is a veritable circular insanity, no one has yet offered any explanation of its exact reappearance as to time and place.

A number of instances were noted in which the drink impulse appeared with exactness at intervals of thirty, forty, or ninety days, and sometimes twelve months. This impulse would break out suddenly and impel the victim to drink under all circumstances and conditions, and, after a period of a few days, completely die out and be followed by intense disgust and aversion. It was noted that most of these cases appeared in families whose ancestors had been very active brain workers, some of them using spirits and others being abstainers.

In one study, about 40 per cent. of all inebriates were found to be periodic drinkers, and about 20 per cent. indicated the parental history of the same form of the use of spirits. It was noted that about 20 per cent. of the whole number were wine and beer drinkers. The children of such parents seldom used spirits in moderation, but were always paroxysmal and excessive drinkers, or strong total abstainers. It was also noted that many descendants of inebriates were very active reform workers, showing unusual energy and zeal in promoting the cause of temperance. In some instances these zealous reformers became secret drinkers and disappeared from public view for a time, then returned with greater energy and zeal. Evidently such persons are impelled to do reform work from an instinct of the danger of their inheritance, and only by helping others can they save themselves.

It is evident that a very large amount of inebriety in America is of the periodic type, in which there is a gathering and exploding of nerve energies—a sort of cyclonic demand for help, from the strain of modern living. This is largely owing to the incessant changes and efforts to adapt oneself to and take advantage of the new surroundings and conditions which are constantly presenting themselves. Moderate drinking in America is becoming a physical impossibility.

Persons who go abroad for health and come back with great faith in the moderate use of wine and beer, soon go on to great excesses in drink and die early from intercurrent disease. The effects of mixed drinks and complex alcohols seem to appear in the descendants, particularly in the masked insanities and peculiar neuroses which break out in the children. A hypersensitiveness to the effects of spirits is another marked peculiarity seen in the descendants of alcoholics. This sensitiveness may be either seductive or repulsive.

Another fact: Where parents have drank for a limited period then have abstained, the children born during the former period show a marked difference in self-control and temperate living to those born later when the parents were total abstainers. Thus, in many instances the drinking descendants were the firstborn children, when the parents thought wine and beer was a luxury and safe remedy. Some remarkable facts along this line await further study. Many descendants of alcoholic ancestors are intensely sensitive to their condition; others are indifferent to the effects. In the former this sensitiveness amounts to delirium, followed by despair and suicide. In the latter it is practically paralysis, both physical and mental. It was evident that the children of drinking parents, while not using alcohol, exhibit great variety of mental perversions, dietetic and sexual excesses, credulity, egotism, and paranoic conditions, which place them in the borderlands of physical and mental health.

The fact is prominent that active brain workers and persons who are intelligent and of the more highly-developed classes more positively transmit the degenerations from the use of alcohol than those lower down in the social scale; also that the drink impulse in children of this class seems to become exhausted, and dies out from causes little known, particularly physical changes of the organism. It was also noted that the defectives and degenerates are followed by inebriates, who contribute very largely to the demented and criminal classes, particularly the insane and those who die early of organic diseases.

The great submerged classes of our large cities are the direct progeny of parents who have failed to transmit normal, healthy brain force and power. Innumerable facts appear along this line which are not questions of of theory but facts, which a further study will bring out. The physical causation of the drink impulse, the drink craze, and the drink symptoms is beyond all question. The fact that the defects, degenerations, and diseases of inebriates appear to the extent of 70 per cent. in their descendants establishes beyond question the transmission of defective germ cells and germ activities.

Alcoholic inebriety, meaning an excessive use of spirits, produces organic defects and derangements of protoplasm, cell growth, cell activity, which is not limited, but goes down to the next generation. The appearance of the same convulsive unreasonable desire for spirits, breaking out about the same time and under similar conditions, in one or two generations following, must be the operation of laws which is yet to be studied. Some unknown condition goes down, and the cell defects may be dormant, until it is aroused to activity by the application of a special exciting cause. There is one conclusion which the clinician is profoundly impressed with, namely: Alcoholic ancestors transmit to the next generation, not only states of exhaustion, low vitality, feeble resisting power, but marked impulses to use alcohol for its pleasing narcotic effects. Exact scientific study of the history of patients furnishes abundant evidence confirming this fact, also that the alcoholic impulse is only a symptom and not the disease; a degeneration and defect from which the patient finds in alcohol and other narcotics the most pleasing relief.

What is needed most is an accurate study of the physical causes and conditions which impel men to drink spirits, take drugs, and become drink and drug neurotics.

DISCUSSION.

Dr. GREENLEES (Grahamstown, Cape Colony) said that he was personally interested in the question of inebriety in South Africa when he ascertained by statistical inquiry and otherwise that mental disease, in the Europeans of that country at all events, depended upon two main causes—namely, inebriety and consanguineous marriages—and he succeeded in getting a resolution passed by the Medical Society, and forwarded to the Government, that increased obstacles should be made to prevent the race obtaining alcoholic drinks. As no nation, however, could be made temperate by legislation, the suggestion was somewhat carried out by increasing the taxation on all spirituous liquors, though whether this had reduced the consumption he was unable to say.

Dr. DAWSON (Dublin) asked whether Dr. Crothers's material enabled him to say whether parental alcoholism pure and simple, apart from any neuropathic heredity, caused mental defect of any easily recognizable form in the offspring. The point was not one easy to decide, as the alcoholism in the parents might be the symptom of inherited neuropathic diathesis till then latent, and the evidence offered before the Royal Commission on the Feeble-minded was very divergent. Several witnesses, but in particular Miss Dendy, expressed the opinion that uncomplicated parental alcoholism did not produce mental abnormality in the offspring. This was in contravention of what one would expect, and of the evidence of others; but Miss Dendy's views, being based on very careful observations on a large number of cases, deserved the fullest consideration. In case that Dr. Crothers thought parental alcoholism did cause mental defect in the offspring, he would like to know whether the mental abnormality so caused was of any special form.

Dr. SHUTTLEWORTH (London) stated that his inquiries at the Royal Albert Asylum, had not shown him that parental alcoholism pure and simple could produce mental defect in the offspring.

Dr. CROTHERS, in reply, referred, as conclusively settling the question of parental alcoholism and defective progeny, to the statistical work carried out in Switzerland, showing that children whose birthdays indicated the coincidence of conceptional periods with times of exceptional feasting and alcoholic excess gave a very high proportion of mental defect.

MONGOLIAN IMBECILITY.*

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CONSIDERABLE interest has been aroused with regard to this subject during the last few months by excellent papers which have appeared both in British and foreign medical periodicals, amongst which I may mention an article by Dr. W. Bertram Hill in the *Quarterly Journal of Medicine* (October, 1908), one by Professor Sante de Sanctis of Rome, in an Austrian publication called "Eôs" (April, 1909), one by Dr. Meltzer, of Waldheim, in a German periodical devoted to the interests of feeble-minded children (*Zeitschrift für die Behandlung Schwachsinniger*, June, 1909), and finally a pathological study by Babonneix appearing in the current number of *Archives de médecine des enfants* (Tome xii, No. 7). An interesting discussion on the subject, with an exhibition of 15 cases, also took place at the Royal Society of Medicine (Clinical Section) on April 30th, 1909; but the limits of time available at that meeting necessitated leaving unconsidered some important points in relation more especially to the etiology. This occasion, indeed, suggested to me that a paper founded upon what I may venture to refer to as an exceptionally large experience of cases of Mongolism might not be unacceptable to *confrères* of the Section of Psychological Medicine at the British Medical Association meeting.

The material upon which I shall base my remarks consists, in the aggregate, of about 350 cases, a fair proportion of which I have personally seen in the course of my official connexion successively with Earlswood, the Royal Albert Asylum, and the Metropolitan Asylums Board, and also in private. For up-to-date notes, however, of the 98 cases tabulated at Earlswood and of the 158 extracted from the Royal Albert Asylum casebooks, as also for particulars of some 20 cases from the Eastern Counties Asylum, I am indebted to the kindness of the medical officers of the respective institutions, and may specially refer to an instructive series of photographs of Mongoloid imbeciles at the Royal Albert Asylum, Lancaster, which Dr. D. W. Hunter (A.M.O.) has been good enough to allow me to show you. I am also under obligations to Dr. Carson, of the New York State Institution for Feeble-minded, and to Dr. Bodil Hjorth, of the Keller Institute, near Copenhagen, for leave to quote their statistics and conclusions.

History.

In such a paper as this I can but very briefly refer to the history of the subject. Cretinism, at any rate in its goitrous form, had been recognized as far back as the time of Juvenal, who writes: "*Quis tumidum guttur miratur in Alpibus?*" and we know that the great Napoleon went so far as to cause a census to be taken of the endemic cases in Canton Wallis (amounting to 3,000) with which the construction of the Simplon road had rendered him familiar. Sporadic cretinism dependent upon congenital absence or deficiency of the thyroid was first described in this country in 1850 by Curling, and its pathology worked out more fully by Hilton Fagge in 1871. I mention this because Mongolism and cretinism affecting children seem to have been commonly confounded in the early history of the ameliorative treatment of idiocy; indeed, correct diagnosis between the two conditions is not always made even at the present day. Cases, however, which we should now refer to the Mongol type were, no doubt, early noticed by Séguin, who in his writings (1846–66) refers to patients resembling cretins, undersized, with husky voices and furfuraceous skins—a class he subsequently designated "furfuraceous cretins." Dr. Caldecott informs me that in the early casebooks at Earlswood certain patients are described as "strumous cretins," such, no doubt, being cases to which John Langdon-Down, many years Medical Superintendent of that institution, called attention in a paper in the *London Hospital Reports* for 1866, as presenting, though of European parentage, many of the facial characteristics of the Mongolian family of mankind.

Characteristics.

Without going so far as to adopt Dr. Langdon-Down's theory of retrogression of ethnic type in such cases, I think we shall admit, looking at the photographs of children now commonly designated *Mongoloid* or *Mongolian imbeciles*, that, though by birth members of the Caucasian (or Indo-European) family, they favour in a remarkable way the features of the Mongolian race. While admitting the resemblances, I think we may also note striking divergences between the physical characters of the real Mongol or Kalmuck and these Mongoloid specimens of the Caucasian race. In the latter, for instance, though the face is broad, there is not the same prominence of cheek bones as in the former; the hair is not usually black, as in the real Mongol, though it is

* This paper was illustrated by a large collection of photographs of Mongolian imbeciles of different grades and from different parts of the world.

straight, wiry, and often scanty; the skin, though sallow, is not yellow, and there have never (so far as I know) been met with the blue patches on buttocks not uncommon in the genuine Mongol infant. The obliquely-placed and often almond-shaped palpebral fissures, with upward and outward trend, and usually far apart, the flat-bridged snub nose, with expanded outward-turned alae nasi, and the tendency to epicanthic folds, are the most notable signs of similarity. Brachycephalism is common to true Mongols and to Mongoloids, but marked flattening of the occipital region is almost a constant characteristic of the latter.

Fig. 1.—Mongolian imbecile. Note brachycephaly.

The form of the hands, with shortened little fingers and thumbs, the flat, broad feet, the curtailed stature and the peculiarities of mucous membrane affecting eyelids, lips, etc., and the scored, fissured tongue appear to be confined to the Mongoloid, for they are not noticeable in the children of the Kalmuck village now on view at the "Great White City." It would be interesting to know whether in degenerate Mongols in the East any of these physical abnormalities occur, but I have not been able to obtain this information. Allowing, however, for the differences I have named, the fact remains—as I think will be obvious from a scrutiny of the photographs I submit to you of so-called Mongolian imbeciles of European parentage—that their physiognomies recall in many particulars those of Asiatic Mongols, and it is remarkable how they all bear, though unrelated, of very varying social class, and natives of far-distant places, a sort of family resemblance to each other. Even lay people recognize the Mongolian physiognomy; and Dr. Still mentions that the mother of a Mongol imbecile under his care in London stated that the neighbours called her child "the Chinese baby," and I have myself known one of this type attending a special school nicknamed by his schoolfellows "John Chinaman."

Frequency.

As regards the prevalence of this type, it seems to vary considerably amongst European nations, being most common in England, where some 5 per cent. of all imbeciles are of this type (Dr. Langdon-Down says 10 per cent. in his experience). Recent statistics of cases at the Royal Albert Asylum show 158 out of 2,900 admissions, and at Earlswood 98 out of 3,700—early cases were probably not recognized as such at the older institutions.

Fig. 2.—Mongolian imbecile. To show furrowed tongue.

Fig. 3.—Mongolian imbecility. To show deformity of hands.

I have no exact statistics from Scotland or Ireland, but the late Dr. Ireland[1] says he has come across cases from the Hebrides, and estimates that 3 or 4 per cent. of all imbeciles in asylums are of this type. In France they would seem to be less frequent, for Bourneville,[2] writing in 1901, stated that amongst 650 children at the Bicêtre and Fondation Vallée there were but 8 Mongols, and that he had not seen more than 20 of this type in the course of his service. In Germany Weygandt, Alt, and H. Vogt reckon that about 1 per cent. of imbeciles are Mongoloid. Dr. Sante de Sanctis of Rome states that he had seen only 20 cases in Italy in seven years. In Scandinavia they seem more frequent, Dr. Bodil Hjorth stating that out of 750 imbeciles in the Keller Institute, near Copenhagen, there are at present 30 Mongols, equivalent to 4 per cent. In the United States of America they seem fairly frequent, forming at one large asylum (the New York State institution) 8.2 per cent. of the admissions in a single year (though apparently less numerous elsewhere). I learn from correspondents that the type is not uncommon in British over-sea dominions. Amongst my illustrations I have the pleasure of showing you two remarkably fine photographs of twin children (boy and girl) from Melbourne, one (boy) normal, the other (girl) a Mongolian imbecile, for which I am indebted to Dr. A. Jeffreys Wood of that city.

Etiology.

A scrutiny of the statistics I have collated (from about 350 cases) brings into prominence the following factors: First, with regard to parentage, in the institution cases, at any rate, the out-standing point is the *advanced age of the mother at the birth of the child.* Thus, of 120 cases in which maternal ages are recorded in the books of the Royal Albert Asylum, forty-one — more than one-third — were over 40 years of age, one mother being stated to have been 47 at the birth of the Mongolian imbecile, three 46, and six 45—one-twelfth, in fact, being 45 and upwards. Only fourteen were under 30 years of age, the youngest mothers of Mongols recorded being 20 and 21 respectively. In eighteen Danish Institution cases in which Dr. Hjorth has kindly furnished detailed information, no less than eleven of the mothers were over 40 years of age, one stated to be 47, and two 44. Under 30 were only two, one of these being a girl of 18. In both these latter cases the children were the first-born. In seventeen cases at the Eastern Counties Asylum (for notes of which I am indebted to Dr. Douglas Turner), six mothers were over 40, one 47, one 45, one 44, and two 43. The average age of mothers at the birth of Mongol offspring seems in this series to be 36; one was only 19 years of age.

The next point that strikes one is the large proportion of Mongol children that are the *last-born, often of a long family.* At the Royal Albert Asylum 68 Mongol children out of 107 whose order in the family had been approximately ascertained were stated to be last-born, and of others (not last-born) 1 was the thirteenth child, 1 the twelfth, 2 the eleventh, and 1 the tenth. Of last-born children, 1 was thirteenth, 2 were twelfth, 2 were eleventh, and 3 or 4 were tenth in the family, dead brothers and sisters being included in the reckoning. It should be added that 1 was an only child and 12 others were presumably first-born children. Of 98 Mongol children recorded at Earlswood, 46 (or nearly 56 per cent.) were last-born, while 13, or 12.6 per cent, were first-born.

The Earlswood tables also show that about 22 per cent. of the Mongol cases belonged to the first half of their families and about 78 to the latter half, and that 46 per cent. of the families producing Mongols consisted of seven or more children. (In England thirty years ago the average number in a family was stated by the Registrar-General to be 4.6; it is probably considerably less now, so that we may consider the Mongol-producing family considerably beyond the average in number of children.) Of the 18 children noted at the Eastern Counties Asylum, 6 at least are last-born and 1 is an only child. The average number in the Eastern Counties Mongol-producing family is between 6 and 7.

Fig. 4.—Mongolian imbecility. To show deformity of hands. Note square, stumpy shape of hands, and curved little fingers. (From a photograph by Dr. R. P. Cockburn.)

It would seem to be fair inference from the figures just cited that more than half of the Mongolian imbeciles in institutions are last-born children, mostly of long families, and that in a considerable proportion — from one-half to one-third — the mothers were at the time of gestation approaching the climacteric period, and that in consequence the reproductive powers were at a low ebb. Which of the two factors—the advanced age of the mother or her exhaustion by a long series of previous pregnancies—is the more potent factor is open to doubt. Both act concurrently in most cases. In one case only have I a note of a late marriage, the mother being 43, and the solitary issue being a Mongol imbecile. But first and only children of the Mongol type are not uncommon, especially in the higher social ranks; I have, indeed, notes of 4 such in a group of 18 private cases with mothers of 35, 25, 20, and 23 respectively; but the possibility of preventive checks in such cases must not be overlooked. Dr. Still suggests that the power of perfect reproduction is often not fully established in the first pregnancy, in which case so-called "prudential checks" may be ill-advised. Certain it is that the production of more than one Mongol in the same family is a great rarity; indeed, I have only heard of 2 such cases, and these are on record at the Royal Albert Asylum. The case of twin pregnancy with offspring of different sex, the boy normal, the girl a Mongolian imbecile, is unique in my experience; but Dr. Hjorth records in his table one instance of twin Mongols.

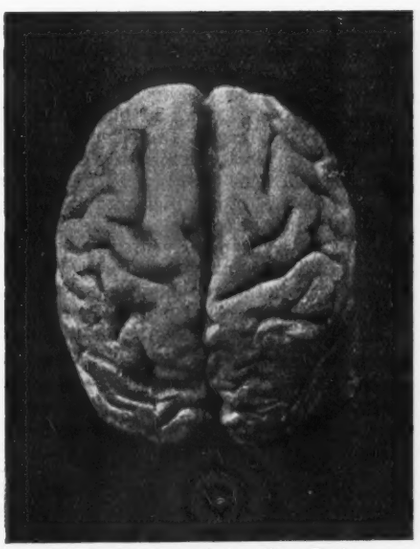


Fig. 5.—Mongolian imbecility. Brain, upper surface.

Fig. 6.—Mongolian imbecility. Brain, under surface.

How far neuropathic heredity is a factor in the production of this type of imbecility has been much discussed, and I fear my notes do not throw very much light thereupon. At Earlswood it has been traced in about 25 per cent. of the cases recorded. Dr. Hjorth concludes, with regard to this type, that neuropathic predisposition is remarkably rare. I can only say that my experience with private cases leads me increasingly to believe in the influence of this factor, and that if one allows sufficient time gradually to attain a more complete knowledge of the family history, it may be discovered in nearly 50 per cent.

Dr. G. A. Sutherland has stated that in 25 cases of Mongolism investigated by him (mostly in hospital practice) he found evidence of parental syphilis in 11. Such a view is not supported by my own experience, either in institution or private practice, and I have notes only of 3 cases in the former and 1 in the latter amongst several hundreds of cases seen. Dr. Hjorth states that in 21 Mongol cases carefully investigated by him there is no single case of syphilis in the parents, and in a list of 20 such cases at the Eastern Counties Asylum the absence of syphilitic history is recorded.

Formerly I was under the impression that a family history of tuberculous disease was the most frequent and most potent etiological factor in the production of Mongolism. I am not certain, however, that I could statistically justify this view to-day. Tuberculous heredity shows largely in the etiology of all the varieties of idiocy and imbecility, and Fletcher Beach and I found it as a probably causative factor in no less than 28.31 per cent. of the 2,380 cases investigated by us in 1891. In 98 cases of Mongolism at Earlswood a phthisical family history has been traced only in 15—that is, 15.3 per cent. In 18 cases at the Eastern Counties Asylum it is reported in 6 (= 33 per cent.). In only 4 out of 21 cases at the Keller Asylum is a definite history given of tubercle in near relatives. It is impossible, therefore, to regard the theory that the Mongolian is *par excellence* a tuberculous type of imbecility as well founded. It is true that the imperfect tissues of the Mongol child are more liable than those of some other varieties to invasion by tubercle bacilli, and hence the large mortality of Mongols especially from pulmonary tuberculosis.

To sum up the etiological evidence before us, I think we may conclude:

1. That Mongolian imbeciles are "exhaustion products"—that is, dependent upon conditions adversely affecting the maternal reproductive powers—the advanced age of the mothers and frequent childbearing being the most noticeable causative factors.

2. That any depressing toxic influences may produce in younger women reproductive exhaustion—for example, neuropathic heredity, giving rise to imperfect metabolism, nervous depression, etc., alcoholism, the poison of syphilis, and tuberculous infection—but neither syphilis nor tubercle is the specific cause of Mongolism. Exhausting illnesses, of whatever kind, during the period of gestation may produce imperfection in the evolution of the fetus and its tissues which we know as Mongolism.

Anatomical Peculiarities and Pathology.

To many of these I have already referred in my introductory remarks, and I need now only refer to some others

which are not so obvious from a survey of illustrative photographs, though easily demonstrable on living patients. The brachycephalic head flattened posteriorly; the oblique-set eyes and epicanthic folds; the depressed nose; the fissured lips; the fitfully protruded tongue with its scored, papillated surface; the broadened cheeks with dilated capillaries giving a ruddy tint; the auricles of simple type, devoid of pendant lobes; the sparse, straight hair and downy growth extending low, all make up a picture of imperfection reminiscent of fetal conditions; and in the living subject we should see lax ligaments and muscular hypotonia, which enable the child to assume positions approaching intrauterine postures—characteristic, in fact, of permanent immaturity suggestive of an unfinished child.

The hands and feet have also well-marked peculiarities, and one of the photographs from the Royal Albert Asylum, and two or three from private patients (for which I am indebted to Dr. Cockburn of Ealing), of an opposing great toe with cleft between it and the next, remind one of the quadrumanous arrangement. The heart is found incompletely finished not infrequently in children of this type, the foramen ovale remaining patent, and defects existing also in the intraventricular septum. The thyroid and thymus glands have been examined for defects, notably by Bourneville, but no important variations from the normal have been noticed by the latter, except in two cases in which he detected thickened trabeculae and sclerosed vessels. I show you several illustrations of the Mongol brain, and you will see that macroscopically it presents coarse convolutions, with few secondary convolutions, and an absence of annectent gyri, the sulci being unusually shallow. The cortex itself is thinner than usual. Microscopically, according to Bourneville, there is marked rarefaction of the cells, and the fibres of the Exner net are very thin. He also speaks of a fibrous meningitis, a condition also noted in a *post-mortem* examination of a higher grade Mongolian imbecile recorded recently by L. Babonneix;[3] but may not this be accidental and not essential to the condition, which is fundamentally one of arrested development? Wilmarth has remarked that in five Mongol brains studied by him, pons and medulla were relatively small, and Sutherland has confirmed this observation.

Mental Peculiarities.

These vary with the degree of Mongolism, which may be superficial or profound. I have seen cases which have only a dash of Mongolism, with only a few of the physical stigmata; but in all there were certain common mental characteristics, such as general backwardness, want of originality but remarkable imitativeness, retarded speech, often a taste for musical rhythm, and usually a placid disposition, though in some cases a species of obstinacy which only yields to tactful management. A tendency to grimacing (with frontal corrugation), protruding and drawing in the tongue, a transient squint, and tricks of mimicry are other signs of peculiar modes of brain action.

Diagnosis.

Cases of the *cretinoid* and of the *Mongolian* type are apt to be confused, especially at an early age, so that it may not be amiss to add here some of the leading diagnostic *differentiae*. As was remarked at the interesting display of fifteen Mongolian cases before the Clinical Section of the Royal Society of Medicine, correct diagnosis is of importance to save parents the disappointment of expecting amelioration from thyroid medication prescribed for Mongolian imbeciles presumed to be cretinoid. In passing, it may be said that, except in *mixed* cases (which occur but rarely), thyroid treatment is ineffective in Mongolism, and whenever a marked effect is obtained the presumption is in favour of cretinism, though this is a much rarer form of imbecility than the former. In tabulated form the characteristic differences may be set forth as follows:

MONGOLISM.	CRETINISM.
1. Characteristics noticeable from birth.	1. Characteristics often not noticeable till sixth or seventh month.
2. Skull brachycephalic: Contour rounded or short oval. Longitudinal and transverse diameters nearly correspond.	2. Skull dolichocephalic: flat at top (fontanelles close late), expanded laterally; broad behind, often asymmetrical.
3. Forehead usually smooth.	3. Forehead usually wrinkled.
4. Palpebral fissures "almond shaped," and more or less oblique upwards and outwards. Frequent epicanthus. Strabismus common. Ciliary blepharitis frequent.	4. Palpebral fissures horizontal, but appear small owing to pseudo-oedema of eyelids. Strabismus and ciliary blepharitis less common.
5. Cheeks chubby, often florid. Complexion mottled.	5. Often circumscribed malar flush; complexion ashy or waxy.
6. Lips often transversely fissured. Lower lip may be pursed up over upper.	6. Lower lip often everted. Mouth open. Drivelling common.
7. Tongue large and coarsely papillated if not fissured. Tongue recurrently protruded and drawn back.	7. Tongue large, but not coarsely papillated or fissured. Tip of tongue thickened, and constantly protruding.
8. Skin smooth in infancy, but furfuraceous later; not redundant or "baggy."	8. Skin dry and scaly; forms folds here and there, being redundant and "baggy."
9. Hair "wiry," often "mouse colour," but sometimes blonde. Downy growth common on forehead and cheeks.	9. Hair harsh, coarse and scanty. Usually of darkish tint (Bourneville says brown); scalp often eczematous.
10. Thyroid gland palpable to greater or less extent.	10. Thyroid gland impalpable to most thorough examination.
11. No fatty tumours (pseudo-lipomata) in posterior triangle of neck.	11. Fatty tumours (pseudo-lipomata) frequently found in posterior triangle of neck, etc.
12. Long bones somewhat shorter than usual, but slender.	12. Long bones shortened and thickened, in some cases bowed.
13. Hands broad; thumb and little finger short, the latter often curved towards ring finger. Fingers taper at ends.	13. Hands broad, thick, and stumpy, with wrinkled skin. Fingers square at tips.
14. Feet large and flat. Fissure between great and next toe often seen.	14. Feet squat; skin redundant about ankles and dorsum of foot.
15. Abdomen often distended; occasional umbilical hernia; often inguinal hernia.	15. Abdomen very bulky and prominent with folds of skin; umbilical hernia common.
16. Expression more or less vivacious and mobile, observant and imitative.	16. Expression dull and immobile; unobservant and apathetic.

Similarities in each Variety.

Deficient stature, flattened bridge of nose, with expanded alae, late and irregular dentition, deferred closure of fontanelles, retarded puberty.

Prognosis.

This differs in proportion to the degree of Mongoloid defect, and may be treated (1) from the physical, (2) from the mental standpoint. Physically, congenital cardiac defects have to be reckoned with in a certain proportion of cases, and in such the infantile mortality is undoubtedly large. Imperfections of mucous membrane, whether respiratory or of the digestive tract (also, it may be, palpebral or nasal), lead to inflammatory affections of lungs, bowels, etc, which may be chronically troublesome, afford nidus for tubercle, and lead to fatal results in early life. Puberty, generally late, seems often to be the starting-point of degenerative trouble, and there is a large mortality (chiefly from tuberculous disease) amongst Mongols between 15 and 20 years of age. Comparatively few arrive at adult years, but much depends on environment and the amount of judicious care taken of them. At a meeting at Normansfield in 1906 the Drs. Langdon-Down showed nine Mongol patients of whom the average age was 35, the oldest being a lady aged 56 (who, I hear, has since died of mere senility). As regards prospect of mental improvement, much may be done by suitable training, proceeding on imitative lines. Habits of propriety and simple educational attainments, such as drawing, writing and reading, may be acquired; abstract matters, such as calculation, are attainable only by the higher (that is, less marked) subjects of Mongolism; and some manual occupation requiring only mechanical skill may be learned. The typical Mongol, however, remains at best an imperfect being to his life's end, destitute of originating power, though a willing machine, needing, however, to be "wound up" regularly.

Treatment.

There is little to be done by medicine in this class of cases, except with the object of improving the general health and condition. Defects of circulation, consequent in some cases on cardiac imperfections, call for tonics, cod-liver oil, and attention to warmness of apparel, but thyroid treatment, though useful in promoting metabolism, cannot be depended on as curative in cases of this type. Treatment to be effectual must be

essentially medico-pedagogic, the medical expert and the skilled teacher working hand in hand. It would be an interesting experiment, and one which I think would be justifiable (though the chance has never occurred to me), to place in an incubator a new-born baby of obviously Mongol type, with a view of seeing how far the signs of immaturity might be overcome by thus supplementing defective gestation.

REFERENCES.

[1] *Mental Affections of Children*, p. 58. [2] *Comptes Rendus* (Bicêtre), and Brouardel, *Traité de médecine*, lix, p. 58. [3] *Arch. de méd. des enfants*, 1909, Tome xii, 7, p. 500.

DISCUSSION.

Dr. LANGDON DOWN (Hampton Wick) directed attention to the shape of the hand in Mongolian imbeciles, and showed hand-prints of a number of such cases compared with a normal hand-print. These showed a marked shortening of the metacarpal bones and the phalanges, and the extreme suppleness of the joints was indicated by the superior ease with which the impress of the centre of the palm was obtained. In addition to the abnormality of the bony structures, these prints showed that the bones of the palm differed from the normal in their extreme irregularity, and the tendency of the principle fold-lines to be two in number only, instead of three as was most commonly the case. This peculiarity was, doubtless, associated with the shortness of the metacarpals. It was a feature so frequently present that it might be regarded as an aid to diagnosis in conjunction with other characters. It was, however, a feature found in imbeciles of other types, of imbeciles where the bony growth was stunted, as sometimes happened in the same way that epicanthus was found in other types, as well as being very common in the Mongolian imbecile. These cases were markedly shorter in stature than the normal, or, indeed, than imbeciles of other classes. This had seemed to be due rather to shortening of the extremities than of the spine. With a view to testing this, a number of male Mongolian imbeciles (mainly adults) were measured and compared, both as regards the sitting height and the full stature, with a number of imbeciles of other types. The observations were not very numerous, but they showed that in Mongolian imbeciles the length of the lower limbs was to the length of head and trunk as 100 to 114.5, whereas in other imbeciles the same proportion was 100 to 105.3. The average sitting height of the Mongol was 32½ in., while that of the others was 34 in. For example, a Mongol of sitting height 33¼ in. showed a total height of 61½ in., while an epileptic imbecile of sitting height 33 in. had a total height 66½ in. If it had been possible to exclude the head and neck from the trunk measurements, the difference would probably have been still more marked, but this was found difficult to do, owing to the very poor development of the vertebra prominens in the Mongol type, which made it impossible to find a fixed point to measure from. The speaker also mentioned a tendency for Mongol children to appear after a non-childbearing interval in the family, and said it was rare for an imbecile of another type to occur in the same family with a Mongol. Mongols stood apart from other imbeciles in respect of palatal development; the bony structures of their face suffered in development, as well as other parts. This led to narrowing of their nasal passages and smallness of their jaws.

Dr. CALDECOTT (Redhill) called attention to the absence of certain details—namely, the age to which Mongolians lived, cause of death, and the general appearance, which more or less disappeared as age advanced. The experience of Earlswood showed that few Mongolians lived beyond the age of 20; that the cause of death was in nearly 100 per cent. tuberculosis, and that if they lived beyond 30 years the characteristic appearance tended to diminish. He also called attention to the fact that thyroid treatment was useless for this class of case.

CONSIDERATIONS UPON THE REPORT OF THE ROYAL COMMISSION ON THE CARE AND CONTROL OF THE FEEBLE-MINDED.

By W. R. DAWSON, M.D.Dub., F.R.C.P.Irel.,
Dublin.

THE references to the Royal Commission, practically involving, as they did, a survey of the existing methods of dealing with mental defect of every kind, and in every civilized country in the world, necessitated the collection of so huge a mass of evidence, and the consideration of so extensive and varied a series of subjects, that it is clearly impossible to discuss the report in any but the most fragmentary way within the limits of a single paper. I shall, therefore, merely touch upon what seem to me to be some of the more interesting points, hoping that the speakers who follow will fill many of the gaps inevitably left.

The state of affairs revealed by the investigations of the Royal Commission may be mildly described as exceedingly unsatisfactory. Even in England it was found that 0.83 per cent. of the population suffer from mental abnormalities of some form or other, of whom a very considerable proportion—in fact, about a fourth—require immediate provision; while here in Ireland the proportions both of mental defect and of undealt-with cases are much larger. There is, therefore, urgent need that some attempt of an organized and co-ordinated kind should be made to deal with the whole class of mental defectives; and, as a thought-out and connected scheme for this purpose, the report should be welcomed and approved, even if one is not prepared to accept the views expressed therein in every detail.

In dealing with the problem before them, the fundamental idea adopted by the Royal Commission is the duty of the State to protect all persons who are prevented by mental defect from taking part in the struggle of life, and to include their property within the scope of this protection. This is no more than an extension of the principle which has long been admitted in the case of the certified insane, and is not likely to be contradicted, least of all by the medical profession. So far as this duty of the State has been carried out, it has been performed by a number of different agencies, but the Poor Law authorities have been the chief agencies dealing with the uncertified cases and the lesser degrees of defect concerned. The evidence shows that the Poor Law has been most inefficient in this connexion; and as the Royal Commission rightly insists that it is mental defect, and not any social circumstances which may arise therefrom, which constitutes the claim of such persons upon the commonwealth, it is perfectly logical on all counts to refuse to recommend that such classes should be left under the management of a system which, even in a general way, has proved so unsatisfactory as to render radical reform imperative—a fact which has been proved by the recent report of the Royal Commission on the Poor Laws. Furthermore, the very varied character of the different classes of defect, their numbers, and the highly special nature of the methods of dealing with them, which still retain a certain connexion and similarity amongst themselves, all render it essential that these cases should be in the hands of a special department, with a strong central authority directing, controlling, and co-ordinating the whole.

This is the conclusion arrived at by the Royal Commission, with which one is in hearty agreement, as also with their view that this central authority should be primarily medical. The peculiar social consequences of mental defect, however, render it necessary that there should be close co-operation between the judicial and administrative authorities, and therefore the amalgamation of the Lunacy Commission with the Chancery Visitors in forming the central authority seems to be justified. The Royal Commission, however, further desires to retain as local authorities the present county councils, while checking any retrograde or undesirable tendencies on the part of those bodies by the power of the central authority. It is useless now to discuss the desirability of placing such power in the hands of the local bodies. The county councils have the management of the asylums, and though there have not been wanting instances of misuse of their power in the past, it may be taken that they will keep it. Upon the whole it is right that they should do so, as far as the management of the institutions is concerned. In view of the erratic and inconstant nature of such elected bodies, however, it seems to me doubtful whether their power should not be restricted even further than is proposed by the Royal Commission. I have long thought that the ideal system would be to turn the asylum medical service into a State service. The Viceregal Commission on Poor Law Reform in Ireland recommended this step in the case of the Poor Law Medical Service, suggesting that the appointments should be made by a central council as the result of an examination, and that the salaries of the

medical officers should be paid from Imperial funds, while leaving the management in other respects in the hands of local bodies. A similar scheme, it appears to me, might advantageously be applied to the medical service to be created in connexion with the various institutions for the care of the mentally defective.

Coming now to the detailed recommendations by which it is sought to give effect to these principles, there are many points on which the opinions of the Royal Commission are more questionable. Thus in the Preamble it is stated that "the three methods of oversight, certification and detention are recommended for the mentally defective," for some of whom "oversight will suffice, for others certification, and for others certification with an order for detention." From Recommendation XXXIV, which deals with the same subject, it appears that "oversight" is used as equivalent to "registration." But how can mere registration or certification, apart from detention, be considered methods of providing care and control in any real sense? Such procedures seem to me to be utterly futile (as, indeed, they have already done to Dr. Dunlop, one of the Commissioners), while at the same time they cost money, and would very possibly furnish the local authority with an excuse for doing nothing, for the intervention of the "friendly visitor" would be nothing short of an intrusion. This point has been taken a little out of its order owing to the prominence given to it in the Preamble.

The first point in the recommendations themselves concerns proposed changes in nomenclature, namely, the substitution of the terms "mentally defective" and "hospital" for "lunatic" and "asylum." With their present connotations, there is no doubt that the latter terms should be changed, and perhaps the substitutes suggested are as good as any. But it must be pointed out that such changes are of temporary utility only. The history of insanity shows a continual effort to mitigate the unpleasant sound of the terms used in connexion with it. Neither "lunatic" nor "asylum" is in itself an objectionable word; indeed, the latter is a kindly term devised to replace the old "madhouse"; and there can be no doubt that "mentally defective"—in itself by no means free from objection—and "mental hospital" will in time sound just as harshly in the ears of the public. In the next place, the "mentally defective" are to be divided up into no less than nine classes, of which definitions are given. Some object to definitions *in toto*, but a certain amount of classification is practically useful, and should be retained, though that suggested by the Royal Commission is illogical and unnecessarily elaborate. Thus, to separate off from the general class of "persons of unsound mind" those whose mental abnormality happens to be due to "age or decay of their faculties" is devoid of any real utility, and would introduce gratuitous difficulties in practice. Again, the last four classes—namely, "moral imbeciles" and mentally defective epileptics, inebriates, and deaf and dumb, or blind, are quite unnecessary, and such cases should be merged with the other idiots, imbeciles, and feeble-minded. As regards the moral imbeciles, the position of the Royal Commission is inconsistent, seeing that they define the class as including "persons who from an early age display *some mental defect* coupled with strong vicious or criminal propensities on which punishment has little or no deterrent effect," yet they do not consider it "scientifically correct" to group cases of *acquired* moral defect into a separate class. The remaining four classes are quite sufficient—namely, "persons of unsound mind," "idiots," "imbeciles," and "feeble-minded"; and the separation of the last three, which differ only in degree, is justified by the difference in the treatment which they require, and the difficulty of finding a single term to cover them all. The definitions themselves, though not particularly scientific, I have found of value in practice, from which point of view they are not likely to be improved upon.

The constitution and powers of the central authority seem upon the whole satisfactory, especially the preponderating importance assigned to the medical element, the insistence that this medical element should consist only of experts, and the provision for the increased medical inspection of institutions for mentally defective persons, together with the simplification resulting from the inclusion of the Chancery Visitors. It is said, however, that those connected with the Chancery Division are opposed to the amalgamation, and that this is also likely to be the view of persons who have relatives or friends under the Court, who would prefer that their money should go to maintain a special set of officials to look after their estates rather than be absorbed to reduce the rates. With this view I have personally no sympathy whatever, but it is one that may have to be faced when legislation is attempted. The extension to all mentally defective persons of the provisions of the Lunacy Act relating to management and administration may also be approved. Lastly, as regards the name of the central authority, there seems no sufficient reason why it should not be called the Board of Control in Ireland as well as in the sister countries. The taking over by the central authority of the licensing of institutions for the mentally defective would remove an objectionable anachronism, and the appointment of medical Assistant Commissioners would relieve the Board of Control of much labour of a more or less routine kind, though whether it is necessary to attach each exclusively to a special district is more doubtful.

The constitution of the local authorities, as recommended, does not seem to call for remark; but under this heading an objection has been raised with reference to the appointment of "certifying medical practitioners" to act on behalf of the committees, it being alleged that any ordinary medical man ought to be capable of doing what is necessary, and that a source of income is thus taken from the general practitioner. It is certainly regrettable to reduce the already too small gains of the rank of the profession; but it may be pointed out that even now the duties in connexion with certification of the insane are none too well performed, and that if the recommendations of the Royal Commission are carried into effect a great deal of work will be created of a new and even more difficult kind. If it is by no means always easy even for an expert to decide whether an individual is sane or insane, it is far less easy to decide upon the status of a case of mere feeble-mindedness, as was amply evident to me in the course of my investigation for the Royal Commission. Experience is essential, and even assuming that the certifying physician may at first have no more than his neighbour, if all cases are to pass under his observation, the experience will soon come. Furthermore, there is no reason why the post in question should not constitute the lowest grade of a series of steps in promotion, the next being the post of medical officer to the local authority for the care of the mentally defective, and then the post of assistant Commissioner. A complete system of special training would thus be afforded, and some inducement offered for devoting attention to this line of work.

On the subject of finance, important as it is, I do not propose to enter, since it is of too special a nature, and I do not feel myself qualified to criticize the proposals of the Royal Commission under this head; but I hope we shall hear about it from some of the other speakers. I would suggest, however, as a matter connected therewith, that the procedure as regards the adoption of plans and estimates for buildings is surely unnecessarily cumbrous, involving as it does the submission of such plans and estimates, when determined on by the local authority, first to the Board of Control and their architect, next to the Local Government Board, next to the Secretary of State together with the Board of Control and the representative of the Local Government Board, and finally back to the local authority. So far as I can see, this lengthy process would have to be gone through for a small addition equally with a large new institution; and it would surely involve an absurd amount of expense and delay. Some limit of proposed expenditure should be assigned, below which a simpler procedure should be made to suffice. An admirable recommendation under the same heading is the adoption of a system of settlement based on counties and county boroughs, the need of which has been severely felt, in this country especially.

The suggested arrangements for the guardianship and supervision of mentally defective persons seem satisfactory, but the very full powers of appeal against the decision of the local authority, first to a court of summary jurisdiction, and from that again to the Quarter Sessions, are likely to lead to endless litigations; and I agree with Dr. Dunlop, one of the Commissioners, in his objection to the system of compelling medical officers and other public officials to notify to the local authority all cases of mental defect

coming to their notice, unless where public assistance is required. Such a procedure is altogether too inquisitorial, and would certainly give rise to friction in practice. It is a good suggestion, however, that the medical officers in charge of institutions for persons of unsound mind should report specially on frequently recurring cases, and such as would be likely to relapse; and here it may be noted with approval that every such institution must have its medical officer, whose duties are to be arranged by the central authority.

In connexion with the procedure for the admission of patients exception must be taken to the recommendations of the Commission in several particulars. Dr. Dunlop himself very rightly objects to the preposterous proposal that the judicial authorities "should be given some discretionary power as to the method of disposal of mentally defective persons," holding that, as in the past, the function of the judicial authority begins and ends with the granting or refusal of the order for detention. I should, however, be inclined to go very much further than this, and suggest that if such sweeping changes are to be made, it might well be considered whether the intervention of the judicial authority, which personally I am inclined to regard as a relic of barbarism, might not be dispensed with altogether in the great majority of cases of what is more and more coming to be recognized as a matter mainly concerning medicine. If, however, this is undesirable in the case of patients entering public asylums, I am at all events very clear that the intrusion of a judicial authority is by all means to be avoided where paying patients are concerned. Here in Ireland we have never had such intrusion, and no disadvantages or abuses have arisen from its absence; and I am very certain that if the patient's case has to be submitted to a judicial authority (who may be a neighbour) before admission to a mental hospital, the existing difficulty in getting patients under special treatment in the early stages of their malady, in which treatment is most likely to be of service, will be intensified tenfold. Even at the sacrifice of uniformity, therefore, I would urge that the difference in the procedure for public and for paying patients as existing in Ireland should be retained if the judicial authority is really indispensable for the former.

Coming now to the education and training of defectives, the removal of such individuals from the control of the ordinary education authorities is inevitable and the recommendations made under this head excellent, except that some discretion should be given in deciding as to whether or not a child is really capable of deriving benefit from training and education, which in many cases it would be sheer waste to attempt. In passing, I would urge the desirability of starting special classes rather than special schools—in the first instance, at all events. In Ireland, if not in England, I believe that much greater difficulty would be experienced in getting parents to send their children to the latter, while the former have further advantages in the ease of transfer of pupils to and from the ordinary classes, and the fact that the defectives are not herded together, but can mix with normal children during play hours as far as may be considered desirable.

Of the other special classes of defectives, the recommendations for dealing with such as are criminal and inebriate may be approved as far as they go; and in view of the close connexion between epilepsy and mental disease, there can be no question that the Royal Commission is right in advising that institutions for sane epileptics should be under the same control. I would go further, however, and in consideration of the recent report of the Departmental Committee on the Inebriates Acts (which, of course, is a subject beyond the scope of the Royal Commission), would venture to suggest that, as the connexion of mental disease with inebriety is just as close as with epilepsy, the system so carefully outlined should be rounded off and completed by the inclusion therein of all homes and institutions for sane inebriates. In this connexion, as well as for other reasons, there should also be legal provision made for suitable cases desiring to enter institutions as voluntary boarders.

Lastly, although the report, upon the whole, is in favour of trying some system of family care in the treatment of the mentally defective, the Recommendation XXXIV, which is apparently intended to deal with this matter, is far too indefinite, and gives the impression that the Royal Commission is half-hearted on the subject. Yet no scheme for dealing with the defective can be held complete which does not recognize the value of this system, so easy of introduction, so elastic, so successful where it has been fairly tried, and so inexpensive.

There is an infinite number of other points which might be touched on, and I have only dealt with a few of the more salient ones—which is, indeed, all that was possible. The recommendations of the Royal Commission are, as we have seen, not perfect—indeed, such perfection would be impossible. But, when all has been said, their report remains a monument of industry and a mine of information, and constitutes the only serious attempt to deal with the problem of mental defect as a whole and with a view to prevention as well as cure. Not the least important of its services will be rendered if it forces on the attention of the nation the existence of unpalatable facts to which most wilfully prefer to remain blind.

DISCUSSION.

Dr. OUTTERSON WOOD (President) said that with regard to the personnel of the Board of Control there could be no doubt that there should be an increase in the number of Commissioners. As the Royal Commission so strongly recommended:

> It is essential that the selection of men to fill these important appointments should have no relation either to party claims or personal predilection.

For certain kinds of work, within certain limits, one person might be as well qualified as another, but for this work, for which wide experience is necessary in combination with special knowledge and administrative ability, the selection we would urge should rest entirely on individual suitability, and should be biassed by no other considerations. No cases required more urgently to be sifted and dealt with by trained experts than those most difficult of all cases, the defectives, who were not certifiable. The report said

> that the powers and duties of the Board of Control should extend to mentally defective inebriates as well as to other classes of the mentally defective.

But what was to be done with those inebriates who were not mentally defective—for these were the cases we were all so anxious to have the power of legally controlling—and who without control went headlong to their ruin. That those who were to have the supervision of these cases should be men of wise experience in the treatment of mental cases, went without saying.

Dr. SHUTTLEWORTH (London) said: In venturing to offer a few remarks on that monument of industry—the Report of the Royal Commission on the Care and Control of the Feeble-minded—it is with some diffidence that I submit to this assembly of practical lunacy experts my own notions derived from an experience in only one corner of the great field of mental abnormality, and that chiefly with children. Personally I have had to do more with congenital aments than with cases manifesting mental unsoundness in later life, and my point of view may consequently be narrow. But I think I may say that in the course of my professional life I have had a pretty extensive and intimate acquaintance with all sorts and conditions of idiots, imbeciles, and mentally defective children in the sense in which that last term has been used in England under the Act of 1899. That Act for the first time brought under educational control, wherever the educational authorities chose to adopt it, the large number of children incompetent by reason of mental defect to benefit by the ordinary elementary school curriculum, but still not so obviously deficient as to be certified under the Idiots Act of 1886 and so "falling between two stools." I am ready to acknowledge that the Idiots Act was intended by those who framed its provisions (in which personally I had some slight part) to facilitate the admission into such institutions as Earlswood and the Royal Albert Asylum of children then known as "higher-grade imbeciles" but subsequently designated (following American usage) as "feeble-minded"—a change really made to propitiate their parents, who are naturally sensitive as to the descriptive term applied to their offspring. Following the example of Germany and Scandinavian countries, the more enterprising educational authorities—for example, London, Leicester, and some others—had formulated a system of special classes for such cases found in the elementary schools. In 1896 the

English Education Department (now the Board of Education) appointed a Departmental Committee (of which I had the honour to be a member), and which pursued its investigations for over a year, and the chief recommendations of its report were embodied in the Act of 1899 to make better provision for the education of defective children in England and Wales. This Act was an adoptive and not a universally compulsory Act, and consequently its application has been restricted to a comparatively small section—about 10,000, I think—of the school population, while the Royal Commissioners calculate that special provision is needed for about 35,562 children in the elementary schools of England and Wales. Moreover, under the Act the educational authority can only take cognizance of children under 16 years of age, and, as we know, a large number of so-called feeble-minded children are perpetual infants needing a lifelong tutelage. To remedy these imperfections of existing arrangements the Royal Commissioners have suggested a drastic change in the law affecting not only feeble-minded but the insane. The main features of their recommendations are as follows:

1. That one central authority, to be known as "the Board of Control," shall exercise jurisdiction over all classes of "mentally defective" persons, juvenile as well as adult, including lunatics, dements, idiots, imbeciles, feeble-minded, moral imbeciles, weak-minded epileptics, inebriates, deaf mutes, and blind.
2. That the local supervision of the persons in these several categories shall be vested in county borough and county councils acting through statutory committees appointed for this purpose. Such committees will be responsible not only for the suitable custodial care of all classes of mentally defectives generally, but must provide for the necessary training of certain cases, and will take over from the Education Committees the manual, industrial, and other training of all mentally defective children, the special schools or classes now in existence to pass from the jurisdiction of the Board of Education to that of the Board of Control. Special schools already established are to be transferred by the Education Authority in each locality to the local "Statutory Committee," unless a contract be made between the two committees whereby the existing systems of special instruction is carried on subject to the approval of the Board of Control.
3. That with regard to feeble-minded ("mentally defective") children a system of record and limited notification be adopted, so that a continuity of control may be possible in after-life.
4. That certification by a single medical practitioner, in a form similar to that prescribed by the "Idiots Act," be required for admission to suitable institutions in the case not only of idiots and imbeciles, but in that of mentally and morally defective persons, and of such inebriates, epileptics, and blind or deaf and dumb of any age as are mentally defective.

From the above it will be apparent that nothing less than a revolution in the lunacy administration of the United Kingdom will come about, should the recommendations of the Royal Commission be embodied in legislation. It may be a question how far it may be advisable to "tar with the same brush" the adult lunatic—even though called "mentally defective" (not, I think, quite logically)—and the simply subnormal child. It seems to me that any scheme of compulsory notification of a young child as belonging to this undesirable class will be attended with considerable practical difficulty; and medical examiners will incur a heavy responsibility in stigmatizing as defective a pupil found unfit for the ordinary school curriculum, but nevertheless capable of benefiting to a large extent by the more individualized instruction practicable in the special class. It is true that the report contemplates (Section 313) "observation centres" in the case both of children and adults, where doubtful cases can be sifted out, and this recommendation would involve (so far as elementary school children are concerned) the institution of separate classes intermediate between the ordinary and the special school, a course which has been advocated by Dr. Kerr and others, and which is actually in vogue in some Scandinavian and German educational centres. Notification too rigorously enforced would militate against the co-operation of parents in obtaining appropriate training for their subnormal children, if so doing involved the prospect of their being speedily and permanently labelled as outcasts under jurisdiction of the Board of Control. Dr. James Kerr, whose practical experience with this class both in Bradford and in London is unrivalled, asks in a recent paper on Physiological Variations in Children (*Medical Chronicle*, July, 1909):

How are we to discriminate at tender ages between these cases? How is one to be certain that the child labelled feeble-minded at 6 will not be labelled normal at 8? The percentag of error between these two ages is 50 per cent. on my own experience.

Notwithstanding the somewhat faint praise accorded by the Commission to the results of training hitherto obtained in the special classes and the residential institutions of this country, and their extolment of American methods, I am inclined to agree with Sir James Crichton-Browne in a recent utterance to the effect

that in all that concerns the education and care of the feeble minded we have been leaders and sound guides; other countries have more to learn from us than we have from them.

I find no recognition in the historical retrospect in Chapter XIII of the investigations of the Committee on the Mental and Physical Condition of Childhood (published under the auspices of the predecessors of the Childhood and Child Study Societies in 1895), which paved the way to the separate instruction of feeble-minded and other exceptional children, as recommended by the Royal Commission presided over by Lord Egerton of Tatton, and which may justly be considered an epoch-making report. The general tendency of the recommendations of the Commissioners is to withdraw from the purview of the educational authorities children of feeble mind, and to transfer them to that of the Board of Control and of local statutory committees charged with the administration of lunatic asylums, hereafter to be called "mental hospitals." How far the dissociation of feeble-minded children of school age from the general system of elementary education is expedient seems to me a very arguable question. Theoretically, no doubt, there is something to be said in favour of all persons mentally abnormal, whatever their age, being brought under the supreme control of a single authority; but it must be remembered that the diagnosis of mental defect in the early years of life is by no means an easy matter, and that there are many conditions of subnormal mentality which may not prove to be of a permanent character. The susceptibilities of parents, moreover, have to be reckoned with, and many would be discouraged from availing themselves of opportunities of special instruction for their children if to do so necessitated their being branded officially as potential lunatics and handed over to the control of a board which, however designated, would be virtually an expansion of the present Lunacy Commission. A wiser plan, and one more consonant with parental (and I think also popular) feeling, would appear to be to keep mentally defective children of school age, as at present, under the educational authorities, and at 16, or earlier if necessary, transfer those who prove to require permanent care (or even supervision) to the official list of the Board of Control. Premature compulsory labelling would tend to defeat its own object—that of early detection with a view to permanent protection—inasmuch as sensitive parents would do their utmost to conceal the existence of children who might be but slightly defective (or, in their partial opinion, not at all so) if the law required them to be placed at once in the official category of the mentally unsound. Those who have had practical experience in the work of the special schools know how tactfully parents have to be handled in this connexion, notably in the first instance, though subsequently they become more ready to admit their children's failings and to avail themselves of arrangements made for their benefit, even, if need be, to the extent of segregation from their homes.

In conclusion, I may, perhaps, briefly advert to the views of the Royal Commission with regard to the training of teachers for the feeble-minded. Whilst concurring in Dr. Ethel Williams's expression of opinion (quoted with commendation in the report) that "*nous*" and capacity are more important than special training, I am unable to follow the Commissioners in their conclusions that untrained assistants would suffice for any large number of the pupils attending special day schools, however this might be in such institutions as the Starcross Imbecile Asylum, which meets with much unquestionably merited praise. As a general rule it seems to me that to be a successful teacher of the feeble-minded, qualifications both of heart and head not one whit inferior to those of the ordinary teacher, and indeed more comprehensive, are absolutely indispensable. The special teacher therefore needs to be well equipped, not only in the fundamental principles of education, like other teachers, but more particularly in such matters as hygiene

and physiology, psychology, articulation, breathing exercises, and the practical arts required in manual and technical instruction. Mere enthusiasm and love of the work, though helpful, will never supersede the necessity of systematic training, and I should strongly deprecate any further lowering of standards of qualification beyond the minimum now fixed by the Board of Education.

In venturing thus to criticize some of the proposals of the Royal Commission, I am far from suggesting that legislative changes, embodying many of their recommendations, are not urgently necessary. Further powers of detention for feeble-minded persons not fit to be at liberty, or whose parents are not fit persons to control them, are undoubtedly desirable, and the idea of public guardianship—not unnecessary interfering with parental rights when judiciously exercised—is an excellent one. What I feel strongly, however, is that to secure the desired results parents of feeble-minded children will have to be tactfully dealt with, and it seems to me that in some points the suggestions are of a *doctrinaire* order rather than of a prudently practical character.

Dr. W. J. MAGUIRE (Belfast), speaking from the point of view of the general practitioner outside asylum work, said that in his dispensary practice feeble-minded children and cases of early insanity were frequently brought before him, and he could not but deplore the fact that nothing was done to provide for the treatment of such cases in large general hospitals in Ireland. Particularly with regard to defective children was Ireland lamentably behind other countries, and he wished to draw attention to the fact that in the whole of Ireland there was but one institution for this purpose—the Stewart Hospital for Imbecile Children.

Mr. FAGAN, Inspector of Reformatories and Industrial Schools in Ireland, said that they had under their care some 8,000 children, mostly waifs from the lower strata of society. They only admitted children who were deemed capable of being trained and likely to earn their livelihood at 16 years of age. Nevertheless, many turned out to be defective, and the necessity of providing for these was forced upon his department. The Government had offered to raise the grant for these cases from 5s. to 7s., and further proposed special and separate institutional treatment for these cases. Now, he (Mr. Fagan) maintained that so long as a certain proportion of feeble-minded to normal children was not overstepped—say, 5 per cent.—their commingling and joint treatment was to their mutual advantage. For that reason he was entirely at one with Dr. Shuttleworth as to the inadvisability of early notification in all cases.

Dr. E. C. BIGGAR (Dublin), Inspector under the Poor Law, emphasized the urgent need for proper provision for defective children in Ireland.

Dr. CALDECOTT, Earlswood Asylum, called attention to the following facts: (1) That the voluntary institutions for imbeciles, of which Earlswood Asylum was the pioneer, had for sixty years been dealing successfully with all types of congenital mental deficiency, idiots, imbeciles, and feeble-minded, as proved by the numbers who were turned into bootmakers, tailors, and those who were able even to set up and sort type in the printing office. (2) With regard to the use of the term "mentally defective" to include lunatics, up to the year 1886 all idiots had to be certified by two lunacy certificates in just the same way as adult lunatics, but that for twenty years previously the Commissioner in Lunacy had in repeated reports to the Lord Chancellor recommended their separation without avail. (3) That this Idiots Act of 1886 was passed through the influence of the members of the Board of Management and managing officials of voluntary institutions. (4) The Royal Commissioners held up the Idiots Act as a model Act on which to base future legislation, and yet—such was the irony of the case—they recommended the remodelling of this Act; or, in other words, wished to cut away the machinery which had been the cause of such successful work. (5) The Commissioners in Lunacy praised the educational and industrial methods of the voluntary institutions to such an extent that they stated that in one of these the results were better than any they had seen in the special classes of the London School Board. (6) The Royal Commissioners further recommended the extension of the charitable side, but if their recommendations were carried into effect they would cut at the root of all charitable work. It was clear that if a person could go to the local authority and have a case taken care of, that person would no longer subscribe to a charitable institution when rates had been paid for the same object. (7) With regard to the financial aspect, the expense, owing to a miscalculation, as intimated by the Royal Commissioners themselves, would be nearer £1,500,000 than the £541,000 stated. The error was caused by (apparently inadvertently) leaving 40,000 persons unaccounted for.

Dr. MORRISON (Hereford) said that the provisions under the Imbecile Act suggested by the Royal Commission were intended to deal with the 28,000 who were to stay unprovided for, and for these no other means appeared to be available than rate aid; and, however much the voluntary system might have in itself to recommend it, it could not overtake the numbers in question, nor be allowed to interfere with the providing of an efficient system of treatment and care for the large proportion unprovided for to-day. While all would like to see Earlswood flourish, and continue its good work, 28,000 were still outside Earlswood.

Dr. DAWSON, in replying, said that he held no brief for the Royal Commission, and that none of his criticisms had been controverted. He therefore had nothing to reply to, but would like to make a few comments on the remarks of the other speakers. He was very pleased to learn that the establishment of classes for defective children had the support of Dr. Shuttleworth and Dr. Kerr, and had proved successful elsewhere. In the course of his investigation of the city of Dublin he had conversed on the subject with school managers, teachers, and others, and all had been unanimous in thinking that there, at all events, special schools would not suit. The parents were often particularly attached to such afflicted children, and would be very indignant if they were stigmatized as defective. He could corroborate Dr. Fagan's statement as to the percentage of defect in reformatory and industrial schools, so far at least as those near Dublin were concerned, the proportion of mental defectives being much higher than in the ordinary schools; and he was also in accord with the other speakers as to the difficulty in distinguishing between children who were permanently defective and those who were merely backward as the result of unfavourable circumstances. In many of these cases only time would show to which category a child belonged. Practically nothing was done in Ireland for defectives. The Stewart institution had nominally 100 beds, but the estimate of the Royal Commission showed that there were some 10,000 mentally defective persons in Ireland, and there was no question more urgently needing solution at the moment than the proper disposal of them. With reference to Drs. Maguire and MacCormac's remarks, he would point out that the Royal Commission had recommended the establishment of receiving houses and wards for the treatment of early and acute cases the admission to which was a simpler matter than to ordinary mental hospitals. Such institutions had proved of value where they had been tried. As regarded the question of finance raised by Dr. Caldecott, it should not be taken that the whole increase in expenditure would fall on the public funds, as it was proposed to make such of the parents and relatives as were able contribute towards the maintenance of defective persons. He was absolutely in accord with the President's remarks concerning sane inebriates.

THE PRESENT POSITION OF MEDICAL PSYCHOLOGY.

BY A. T. SCHOFIELD, M.D.

IN treating any subject from a somewhat new standpoint, it is necessary in the first place to define the words we use. By "medical psychology" I mean psychology as applied to medicine, and do not for a moment practically limit it, as the Medico-Psychological Society, to the study of insanity. On the contrary, in this short paper I shall have nothing to say about insanity, but much as to the curative use of the sane mind in medicine. The idea of the scientific use of the mind in disease by either doctor or patient has hardly yet, in this country (and here I specially refer to England), entered the sphere of serious medical thought.

The very idea of the therapeutic power of mind is by most men still treated with impatience or contempt, and this tone is fostered by our principal medical journals, by neither of which has the subject ever been seriously brought forward or discussed as it should be.

The fact is few are at the pains really to understand what is meant by psycho-therapeutics, or to believe that there can be a true science of such a subject. The word is generally dismissed as being synonymous with Christian Science, mental healing, hypnotism, and a score of other words of ill-fame to medical men.

Those who are not so hasty or inaccurate in their remarks are inclined to agree that possibly there is something in it, and that it may be of use in some nervous cases. Others go even further still, and declare that every doctor practises it in some way or other, and that every one knows the power of the mind over the body; and they cannot, therefore, waste their time over the study of such a silly and obvious subject, which is as old as medicine itself.

Now there can be no doubt that there is some truth in this last view, and that the power of the mind over disease is largely, though generally unconsciously, used by the doctor in his daily practice; but what I wish to ask to-day of this Section is this: Why is an agency so generally used nowhere taught? and is it in accordance with enlightened views on sound practice in medicine that a subject so fraught with powers for good and evil, which are everywhere felt, should be nowhere taught or discussed?

To support this assertion, let me hand in as evidence the returns from 42 leading universities and schools of medicine in Great Britain and Ireland. To each of them the following three questions were put:

1. Have you any lectures on psychology other than those on insanity?

2. Have you *any means* of instruction in psycho-therapeutics, or the use of the mind in medicine?

3. Have you any textbook in use on this subject?

The 42 answers received are marked private, and I cannot therefore give any names in the summary I lay before you now.

To the first question as to the teaching of applied psychology (other than on insanity) 14 answered "Yes" and 28 answered "No." To the second question as to actual instruction in psycho-therapeutics or the power of mind in medicine, 7 answered "Yes" (but two at least, and probably more, teach it in connexion with insanity only), and 35 answered "No." To the third question as to whether they had any textbook on this subject, 2 answered "Yes" and 40 "No."

Every university in the United Kingdom answered "No" as to the teaching of any form of psycho-therapy or the use of any textbook. I am pleased, however, to record that in the seven who do teach this subject, our largest medical school is represented, as well as three or four others of great influenee.

On the whole, however, I think these returns fairly justify my assertion that, taking our medical curriculum as a whole, this important subject is not taught.

One thing is quite clear, and that is if a science be everywhere used it must be of use; and I am quite sure the most advanced among us here have little idea how much in every-day practice the power of the mind over the body is (mainly unconsciously) used by practitioners everywhere. It is, indeed, impossible to separate the value of the personality of the physician from that of his work. The two go together, and it is the former that is often the secret of the success of the latter. One common reply to any request for scientific teaching is that the subject is incapable of being taught, and that doctors know all about the subject that they wish. Do they? I doubt it, even in England. Certainly they do not anywhere abroad, for in Germany, France, Switzerland, and the States ceaseless investigations are being made, the subject is treated scientifically, and numerous textbooks are written on it. It is only too true that the present spirit of scientific journalism and of hospital tradition in this country is set against it, and on this account this paper is written. But is it not time such a prejudice were removed, even though it be reasonably founded, as I believe it is, on the flagrant abuse and exploitation of these great powers everywhere by quacks?

As to the idea that it cannot be taught, it is on a par with its fellow fallacy: that it can be thoroughly known without any teaching. Both ideas are false, and betray a profound ignorance of medical psychology. Dismissing for a moment the study of insanity, it is, I think, clear that medical men in England as a body have hardly yet grasped that there is any direct connexion between psychology and medicine. Is it too much to suggest that our knowledge of this subject, *in this country only*, is still so scanty that, were it not for the insane, this very Section might cease to exist? I have striven, hitherto without success, though so warmly supported at Toronto and elsewhere, to secure a tacit agreement that the third day in each session be specially devoted to this profound but little-known subject.

Consider for a moment this fact: There are other aids to therapeutics, such as electricity, heat, light, balneology, hydropathy, and the like, that are optional subjects of study, and if a man does not choose to study them, at any rate he does not practise them, for in no sense is he obliged to. But in psycho-therapy the reverse obtains. No physician can prevent his patient's mind being influenced, nor can he stop this influence from affecting the body for good or ill. No physician can leave his personality at home when he pays his visit or when he goes to sit in his consulting room. Psychology is thus ever at work, largely unconsciously, but with great effect and power in therapeutics; and for want of knowledge and study of the subject many doctors unconsciously inflict mental injuries and nerve shocks upon their patients they would be the first to deplore. No week passes in my life, and I should think in that of many other physicians, but one meets or hears stories of patients more or less damaged by bad suggestions, by the unwise disclosure of facts, or the still more unwise discussion of probabilities and inferences, by the depression and gloom of the physician, by his indiscreet queries and doubtful looks or "hesitating manner." Doctors have little idea how these "trifles," as they are thought, often extinguish hope and produce despair, and in various ways injure their patients. I will not weary you with specific cases, where gloomy heart and lung prognoses have done needless damage, though I cannot forget certain terrible instances of the unconscious injury doctors do for want of knowledge. Far better practise electricity or balneology of all sorts without previous knowledge or textbook than play with the minds of patients as of no importance in their treatment.

Fear sometimes works more evil in the body than strychnine. It can kill, it will retard recovery in every disease, it lessens the powers of resistance all over the body, and it is only too soon aroused in a timid patient listening to the verdict of some great but, as far as psycho-therapeutics goes, ignorant man.

Let us look for a moment at the subject, and see if there really is nothing to be taught. We have, in dealing with the question of doctor and patient, at least eight psychic factors of importance to reckon with, and all will be used in some way for good or evil whether the doctor knows anything about it or no. The situation, indeed, is as if there were infusions prepared of eight powerful drugs that the patient would certainly have to take somehow, but the quantities and strength of each drug were entirely in the doctor's hands. It is obvious, if such were the case, how keenly the qualities and doses and effects of these drugs would be studied, and everything that was possible would be learnt about their power. Now these eight drugs of a mental character are really there, and are all of great potency. Is it too much to suggest to this Section that their use and abuse shall form part of the curriculum of every medical student?

Let me say what they are. There is the doctor's power of reason, of emotion, and of will; the same three are in the patient; and then there is the patient's psychic and his physical environment—eight factors in all.

Hundreds of medical men outside our somewhat self-sufficient and self-complacent kingdom are studying the therapeutic values of these eight forces and how to use them scientifically; but within our own small insular circle I doubt if there be half a dozen.

At Sheffield last year, in a special session on improvements in medical education, I raised this question emphatically, but I fear it fell upon deaf ears. Now, in what way can these eight factors affect the course of disease?

The doctor's reason, if trained psychically, does not content itself with prescriptions of drugs and other remedies, but with a rapidity that knowledge and practice alone can give surveys the psychic side of the case, and sees at once in what way he can use these mental forces to the best advantage. He sees, for instance, it will be of the greatest value in the case to make a careful and detailed examination, to impress upon the patient the beneficial effects of a certain remedy, to change a certain nurse, to provide some entertaining literature, etc. His emotion comes into play with great power in making the patient feel by the subtle contact of real sympathy, devoid of mere sentiment, that he takes deep and special interest in his case, and that he understands the patient; and his will may be made to inspire the latter with the belief that the doctor will surely carry to a successful issue what he undertakes.

Turning now to these factors in the patient, let us see how they may be used.

The patient's reason is by no means a faculty to be so entirely neglected with impunity as medical men in general seem to think. All will agree that the first element of successful treatment is that the patient should have full confidence in his medical adviser, and to this end the patient's reason—or, at any rate, that which passes as such, and certainly is considered as such by the patient—comes into play. He sees and feels, in the first place, he is in the hands of a skilful and careful doctor; and his reason arrives at this judgement by observing the care of the examination, the searching nature of the questions, the certainty of the diagnosis, the care in the directions, and the skill everywhere displayed. On the other hand, a really clever man may enlist the patient's reason against him if he, ignorant of psychic therapeutics, makes a hasty and, to the patient, incomplete examination, displays great hesitation in diagnosis, and dismisses the treatment in a few words. The result often is that all confidence is lost and recovery delayed, or the patient leaves the man altogether for very possibly an inferior physician, but one, at any rate, dimly aware of the necessity of securing the patient's confidence.

The patient's emotions are also not to be neglected. A cold and indifferent manner may of course conceal real ability, but in the wise physician it certainly will not be allowed to. Little kindnesses and considerations, for which there is abundant opportunity on the physician's part, not only earn the gratitude of the patient, but help to no small extent in his recovery.

The patient's will, too, may be not only a strong factor, but in some stages of severe disease—as, for example, in the third week of typhoid fever—not infrequently the determining factor in the recovery of the patient. I have known more than one such case where, as far as one could judge, recovery was due to the strong excitation of the patient's will on the side of health. Curiously enough, one of these was the case of a very clever nurse apparently dying at the Sussex County Hospital, and whose will up to then had been absolutely paralysed all through by the firm conviction that in her case typhoid would certainly be fatal. At 11 one morning this superstition was destroyed, and her will was so enlisted on the side of health that the moribund woman got well from that hour. No single case of this sort carries conviction to any who were not eye-witnesses. It is the accumulation of them that leads to the inevitable conclusion of the therapeutic value of the patient's will. There remain the powers of environment, psychic and physical.

On the psychic side how much depends in the progress of operation cases on the spirits of the patient and a sanguine, cheerful, and agreeably distracting environment! Some nursing homes are more like gaols than sanatoriums, and some sisters and nurses have little knowledge of the importance and value of manner and influence. The doctor's daily visit may be included in the general psychic environment, and he little knows how his pleasant smile on entering and his few cheery, hopeful words on leaving the sick-room act as strong tonics to the patient. On the physical side cleanliness in all the surroundings, and in the food good cooking, and care in little things—a bright, cheerful room and a good look-out, perhaps a plant or a bird; nice, amusing books and a good shaded light—in short, comfort, cleanliness, and brightness all play their parts to the great end of the patient's recovery.

Scientifically how much there is to learn as to the exact *modus operandi* of these eight subtle powers. All we know at present is that somehow or other, often by routes outside the patient's consciousness, they so stimulate the patient's *vis medicatrix Naturae* that the general vitality is increased, the metabolisms on which recovery depends are quickened, the poisons expelled, and the circulation stimulated. What is certain is the value of these remedies when rightly and wisely employed, and their power for evil when misused.

As I must now shortly close these few remarks, it is out of my power to enforce as I could wish my statements with numerous examples of how their powers in right hands heal, and by wrong use destroy the patient. There are, however, but few men but could supply some case from their own experience.

I may in conclusion point out that the importance of urging this subject at the present time is obvious if we confine ourselves to two considerations only: the first is that, as pointed out so forcibly by Dr. Rankin in the JOURNAL recently,[1] that functional nervous symptoms are rapidly acquiring increased prominence in every class of disease; and I need hardly say that these are the symptoms over which psycho-therapeutics has a most marked power. He observes that the type of disease is becoming, in a word, more psychic and less physical, as, indeed, advancing civilization would lead us to expect. This being so, it is obvious that psychic methods of treatment are necessarily brought more to the front, and therefore I submit to this Section that it is high time that the study of applied psychology in relation to disease be included in the medical curriculum, and that Dr. Osler's weighty suggestions in his address on the treatment of disease, reported recently,[2] be heeded. He says:

"Much more attention should be paid to the important subject of psycho-therapy. It is not every teacher who has a special gift for this work, but if the professor himself does not possess it, he should, at any rate, have sense enough to have an assistant familiar with and interested in the modern methods. How many of our graduates have been shown how to carry out a Weir Mitchell treatment or to treat a patient by suggestion? The student should be taught that the very environment of a well-managed clinic is in itself an important factor in psychical treatment. A Philadelphia friend once jokingly defined my practice at the Johns Hopkins Hospital as a mixture of hope and nux vomica, and the grain of truth in this statement lies in the fact that with many hospital patients once we gain their confidence and inspire them with hope, the battle is won."

I think we may fairly look upon these weighty words as an endorsement of the principle of my whole paper.

My second reason for pressing the matter at this time is the enormous increase of every form of quackery in the centres of civilization; and I feel sure the JOURNAL was right when, in a recent issue,[3] a leading article concluded with these words: "The only way in which superstition and quackery will soon be destroyed is the production of an intellectual soil in which they cannot grow."

Gentlemen, it is for this intellectual soil I plead, and trust I may not plead in vain.

REFERENCES.

[1] BRITISH MEDICAL JOURNAL, June 3rd, 1909. [2] Ibid., July 24th, 1909. [3] Ibid., July 10th, 1909.

RESOLUTIONS.

The Section in the course of its proceedings passed the following resolutions unanimously:

1. That in the opinion of the members of this Section, the subjects of Psychological Medicine and Neurology should be combined in one section and called "The Section of Psychological Medicine and Neurology," and that this resolution be forwarded to the General Council for its consideration.

(Proposed by the PRESIDENT, seconded by Dr. D. G. THOMPSON.)

2. That the Section of Psychological Medicine of the British Medical Association is of opinion that the attention of the National University of Ireland, and of the Queen's University of Belfast, should be respectfully called to the desirability of establishing Lectureships in Mental Diseases

in connexion with the Medical Faculties of each of the Constituent Colleges, and that this resolution be forwarded to the Council.

(Proposed by Dr. W. R. DAWSON, seconded by Dr. M. I. NOLAN.)

3. That this meeting of the Section of Psychological Medicine of the British Medical Association desires to express its approval of the Asylum Officers Superannuation Bill, and that this resolution be forwarded to the Council.

(Proposed by Dr. G. R. LAWLESS, seconded by Dr. DUNCAN GREENLEES.)

SECTION OF ANATOMY AND PHYSIOLOGY.

Professor C. S. SHERRINGTON, F.R.S., President.

PRESIDENT'S INTRODUCTORY REMARKS.

PROFESSOR SHERRINGTON, in initiating the work of the Section, limited himself to a short speech in which he welcomed the members present, and drew attention to the main features of the programme of work. To make their discussions fruitful attention to structure must be combined with considerations of function.

THE SKELETON IN ACHONDROPLASIA.*

By A. FRANCIS DIXON, M.B., D.Sc,
Professor of Anatomy, Trinity College, Dublin.

DURING the last few years I have had an opportunity of examining the skeletons of a series of achondroplasic dwarfs. Five of these are now preserved in the Museums of Trinity College, Dublin, and a portion of the skull of another was kindly lent to me by Professor Fawcett of Bristol. My observations are far from completed, but as a study of the skeleton in such cases often throws interesting side-lights on the normal mode of development of the skeleton, I venture to bring a few notes before the meeting and to exhibit a few photographs of the specimens.

The form of dwarfism to which the term "achondroplasia" or "chondrodystrophia" is applied has been studied in recent

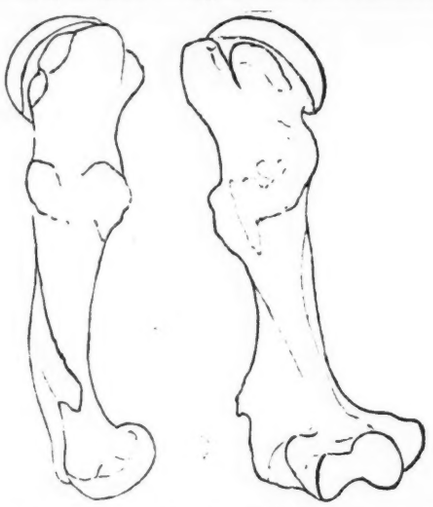


Fig. 1.—Adult male, achondroplasic. Right humerus, from in front and from the outer side. The short, thick diaphysis, the relatively large extremities, and the exaggerated curvatures of the bone are well seen. The markings for muscular attachments are extremely strongly developed. The humerus measures 158 mm.

years by several observers both in this country and on the Continent, but I do not propose to deal with the growing literature on the subject.

During life the individuals who are subjects of the disease are easily recognized—the trunk is practically normal in length, the upper and lower extremities are very short, and the head, especially the cranial portion, is of large size. The umbilicus lies below the level of the mid-point of the body, owing to the shortness of the legs. The muscles are strongly developed, and there is usually a considerable amount of superficial fat. The bulging cranium is rendered very prominent owing to the marked depression which exists at the root of the nose and the backward thrust of the upper part of the face. The face is of small size, especially in its upper part, but the chin and lower jaw are well developed.

I propose, by means of a few slides, to illustrate the most marked peculiarities of the skeleton, and I shall take, in the first instance, the bones of the upper extremity as examples of the long bones. The humeri are short,

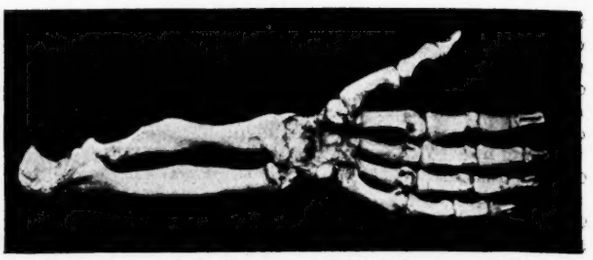


Fig. 2.—Bones of the forearm and hand from an adult male achondroplasic. The carpal bones are practically normal in size; the metacarpals and phalanges are shorter than normal, but not so much affected as the radius and ulna. In the normal hand the length of the skeleton of the middle finger was found to be from $\frac{6}{10}$ to $\frac{7}{10}$ that of the corresponding radius. In the achondroplasic skeletons the length of the metacarpal and phalanges of the middle finger was at least $\frac{9}{10}$ that of the corresponding radius, and in one specimen the skeleton of the middle finger was longer than the radius.

thick, and stout, the muscular markings are extremely well marked and the normal curvatures are much exaggerated. We notice that the ends of the long bones are practically normal in size, and in all the long bones we find that the rule holds that the parts developed from the epiphyses are almost of normal size. The diaphyses which ossify early are in all cases extremely short. The specimens which I have examined bear out the opinions which have been put forward—namely, that the condition, as regards the limb bones, is one which affects the early formed enchondral ossifications. These remain short, but become extremely thick owing to the deposit of periosteal bone upon their surface. The periosteal bone is actually excessive in amount, as is well seen in *x*-ray photographs of the fetal

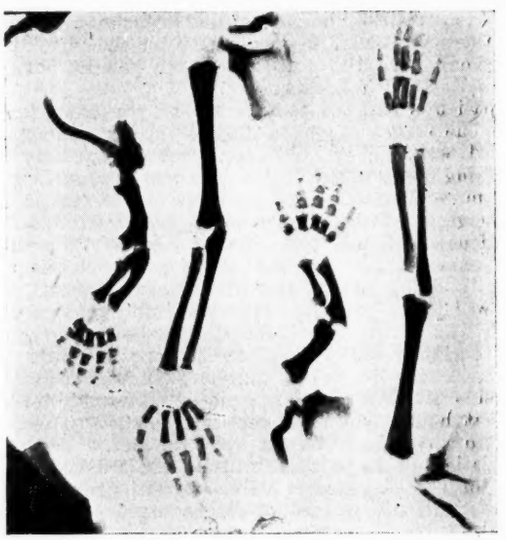


Fig. 3.—*X*-ray picture of the superior extremities of an achondroplasic fetus compared with those of a normal fetus of the same age. The thick, short, strongly curved diaphyses of the humerus, ulna, and radius are well seen. The phalanges and metacarpals are also involved, but the clavicle—best seen in the specimen to the left hand side of the figure—is normal in size, and is actually longer than the corresponding humerus. (Photograph kindly made by Dr. W. G. Harvey.)

achondroplasic skeleton. It is interesting to notice that the clavicle is little or not at all affected at birth, and its escape is almost certainly to be associated with its peculiar mode of ossification. In the full-time achondroplasic fetus the clavicle is actually longer than the humerus, and in the adult it may be as long as or longer than the radius.

The peculiarities of the skull in achondroplasia have received the attention of many authors. We have the globular cranium, the bulbous frontal region, causing the

* The paper was illustrated by a number of lantern slides

anterior end of the longest diameter of the skull to lie above the glabella. The depression at the root of the nose is very marked, and the backward thrust of the face is striking. The part of the base which is ossified in cartilage is much contracted both in a longitudinal and in a transverse diameter. I have found the posterior part—namely, the part which lies behind the pituitary fossa—the most affected. The angles formed between the various parts of the base differ widely from the normal. The base of the skull appears as if thrust upwards into

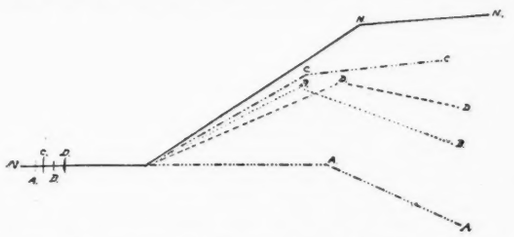


Fig. 4.—Diagram to illustrate the manner in which the base of the skull is affected in achondroplasia. AAA, BBB, CCC, DDD, represent four achondroplasic skulls, and NNN a normal skull. From left to right, the points plotted are the opisthion, the basion, the prosphenion, and the nasion. The diagram brings out the small size of the foramen magnum and the profoundly modified basal angles in the achondroplasic specimens.

the cranial cavity, and the basi-occipital part is almost vertical. The petrous temporal is so much contracted that the posterior semicircular canal projects into the posterior cranial fossa. The foramina in the cartilaginous base are much reduced in size.

We have in achondroplasia a condition which illustrates the results of interference with enchondral ossification, and we note that in the limbs those enchondral bones which are first formed are most affected, and those which appear later are less so.

DISCUSSION.

Professor C. J. PATTEN (Sheffield) asked if the spur-like process above the external condyle seen on some humeri in the specimens exhibited had any relationship to the condition of the achondroplasic skeleton. He asked Professor Dixon also whether he had observed asymmetry in length between two corresponding long bones. In a specimen of a humerus obtained by him a short time ago there was present a pronounced spur-like process above the external condyle, and this humerus was longer and thicker than its fellow.

Dr. WATERSTON (Edinburgh) compared the changes present in the base of the skull in achondroplasia with those found in Mongolism, and pointed out that in achondroplasia a condition was found which was the reverse of that in Mongolism, where the head shape was affected primarily by the brain growth and not by a skeletal change. He also remarked that in this condition the growth of the vertebral column was not affected, while the growth of the base of the skull, which was in morphological continuity with it, was so affected. He asked also for information regarding the condition of the genital glands in such dwarfs.

Dr. SCANES-SPICER (London) observed that achondroplasics were very prone to thickenings in the naso-pharynx, and frequently required treatment for adenoids. He also instanced examples of subjects who in the early years of their life resembled achondroplasics, but when aged 18 or 19 took on the characters of acromegaly.

Mr. N. C. RUTHERFORD (Edinburgh) said that Professor Dixon's demonstration of specimens had to his mind established a very decided case for the view that the chondral foundation of the skeleton was early affected in ontogeny by some pathological influence—the unknown algebraic "x" of this discussion. He had demonstrated that this pathological influence is, first, limited to the early chondral-formed skeleton, as was shown by the unaffected membrane-formed clavicle; secondly, that this pathological change was one of diminishing intensity during embryonic life, as was indicated by the little affected late-formed prechondral phalanges. With these premisses he would like to ask Professor Dixon how he would explain the diminished condition of the facial membrane-formed bones? The primary chondral skeleton of the superior maxilla was, as is well known, superseded during ontogeny by a definitive membranous skeletal basis. He would be glad to hear in what way the facial changes were related to the impaired chondrification of its earlier cartilaginous support in achondroplasia. As to any mechanical effect of impaired chondrification of the primordial cranial basis affecting the formation of the human pituitary body, he considered that entirely excluded by the fact that the upgrowth of the hypophysis preceded by a considerable period the appearance of the chondral basis cranii. What, however, seemed a possible and more likely explanation was that the subsequent pituitary growth was limited—perhaps otherwise pathologically affected—by the imperfect formation of the bony cavity of the sella turcica. This might be an explanation of the succeeding quasi-acromegalic condition noticed clinically by a previous speaker.

The PRESIDENT OF THE SECTION discussed the causation of the marked muscular prominences on the long bones and the influence of the lines of stress and strain in the shape of the femur. The muscles which exhibited "tonus" produced the most prominent markings and thereby contributed to the sculpturing of the bone.

Professor DIXON, in his reply, said that the cranial capacity in cases of achondroplasia was variable, that the brain was frequently hydrocephalic, and that the pituitary body exhibited no macroscopic changes, but he had not so far had an opportunity of making sections. In reply to Dr. Patten, he said that there was a partial form of achondroplasia, which was characterized by asymmetry. The bones of one side might be affected, while those of the other side escaped. The genital glands in the subjects examined—three in number—were not affected. With regard to the cephalic index, there was a great deal of variation. One of the chief features of the skull was the great distension of the upper part of the cranium.

SOME POINTS IN THE MECHANICS OF RESPIRATION.

By ROBERT HENRY SCANES-SPICER, B.Sc., M.D.Lond.,
Consulting Surgeon, Diseases of the Throat, St. Mary's Hospital, London.

[ABSTRACT.]

THE paper discussed: (1) The variations of stress, strain, and friction in the throat and larynx in costal and abdominal breathing respectively; (2) the significance of the transverse axis of cricothyroid rotation in respiration.

At the present time, Dr. Scanes-Spicer said, much activity is being displayed by anatomists and physiologists in reference to the mechanics of respiration. The conclusions embodied in this communication are based chiefly upon the clinical study and treatment of diseases of the throat and larynx during the past twenty-five years, but also, over the same time, upon a critical study and personal experience of most vocal methods and physical culture systems, and upon recent literature of respiratory mechanics. Some of my conclusions differ from those held by leading authorities, and some are quite new. If deemed correct by experts after due examination, as I am convinced they are, I trust they will be embodied in that reconstruction of modern teaching concerning respiratory mechanics that is so urgently needed.

Dr. Scanes-Spicer then demonstrated the working model he had constructed to illustrate his conceptions on the two special points referred to.

I.—COSTAL RESPIRATION.

On inspiration (in the living subject) the vertebral column is fully extended or straightened out. On gently depressing point A on the model it would be seen that:

(1) There was no downward movement of larynx or trachea.

(2) There was no rotation of the cricoid on the thyroid.

(3) The strain in the whole air tube was lessened; indicated by:

(*a*) A shortening of the springs suspending the larynx.
(*b*) The rise of the mercury in the proximal arm of the U tube connected with the air ball.

(4) The bezel of the cricoid tended to move away from the spinal column.

II.—Abdominal Respiration.

On inspiration (in the living subject) the head is thrown back; there is increased tension in the muscles at the back of the neck and increase of flexion of the cervical spinal column.

These points were illustrated by gently depressing point B. By a mechanical arrangement, traction was made on the trachea (and the cricoid to which it is attached) in the direction in which the inspiration-descent of the diaphragm would pull it down. These movements were simultaneous as in Nature.

It will then be seen that:

(1) There is a vigorous downward movement of the trachea and cricoid.

(2) The cricoid rotates forwards upon the transverse crico-thyroid axis leaving the thyroid.

(3) All the tensions in the air tube are increased, indicated by:

(*a*) The suspension springs are stretched tightly and elongated.

(*b*) The mercury rises in the distal arm of the **U** tube.

(4) The heel of the bezel of the cricoid presses against the spinal column with an intensity proportional to the vigour of the diaphragmatic pull and a corresponding compression of the soft tissues between the bosses of the posterior cricoid arch and ridges of spinal column. This, if continued indefinitely, according to my conception, may cause irritation and the requisite abnormal stimulus to cell proliferation, and also to penetration, characteristic of cancer.

If the other hard parts be considered and compared similarly, it would appear that similar augmentation of the force with which these hard parts normally drive or plough into the soft tissues, or rub, or squeeze, or press, or stretch them, can be inferred.

The following points were then considered in some detail:

1. The influence of the respiratory mechanism on the functioning and form of the whole body, its intimate association in action with the postural mechanism, and the co-ordination of these in education.

2. The cardinal importance of the correct application of respiratory and postural mechanics, not only in all vocal and physical training, but also in the prevention and cure of many disorders.

3. Some common delusions among investigators in respiratory mechanics:

(*a*) That workers' own mode of breathing is normal, if not ideal.

(*b*) That it is all right if no discomfort or distress is detected.

(*c*) That as long as breath gets in and out, the manner thereof does not matter.

(*d*) That habitual misuse of respiratory mechanism during youth and growth will escape registration in the adult form and functions.

4. The unsatisfactory nomenclature in use to designate types of breathing requires radical reform. *Diaphragmatic* should not be used to denote a mode or type, since all ordinary breathing is diaphragmatic. Besides, the term is ambiguous—for example, the French school understand by it abdominal breathing; and it has very recently been used by a leading physiologist to denote *mixed* breathing—that is, combined costal and abdominal. Up to now the generally accepted terms for the types it is desirable to contrast sharply are "costal" and "abdominal." These are, however, not sufficiently definitive. As indicating the leading characteristics of the type and non-ambiguous, substitution of *back breathing* for the former and *belly breathing* for the latter are suggested.

5. In back breathing each inspiratory impulse tends to extend the spine to its fullest length and to raise and expand the thorax. This latter is effected partly by spinal extension and partly by diaphragmatic contraction acting from fixed fulcrum formed by the abdominal viscera.

6. The abdominal viscera are maintained in place (as fulcrum for the diaphragm) mainly by the above spinal extension and thoracic elevation tending to distance the lower margin of the thorax from the bony pelvis, thus tightening up the whole belly wall. Assistance is perhaps given by waning contraction of belly-wall muscles passing over from preceding expiration, and also by normal tonus contraction of healthy abdominal muscles.

7. In normal expiration the spinal column should be maintained extended, and the chest raised. Then elastic recoil of displaced parts takes place, but active contraction of muscles of the belly wall *commence*, *control*, and *complete* the phase—equally in ordinary breathing and in voice production.

8. Back breathing promotes the emptying of the portal area in both phases. On inspiration, by strong thoracic aspiration of blood from the inferior vena cava; and on expiration, by active muscular compression of viscera. It thus helps the circulatory system.

9. Back breathing is the mode that was aimed at by the old Italian school of singing masters, as it was also the mode by which the frame of the young Greek in classic times was moulded, evidenced by the universal testimony of Greek statues and vases.

10. In belly breathing the spinal column is bent forward, often the back hollow; the thorax sunken and shallow; the diaphragm (on the inbreath) descends bodily into the abdominal cavity, carrying with it all the thoracic and abdominal viscera, and either making the protuberant belly *heave*, or, at all events, producing a hard *push* or *thrust* in the epigastrium. Passive dilatation of the belly wall soon ensues, and the outbreath is mainly an uncontrolled elastic recoil.

11. Thoracic aspiration being insignificant and abdominal muscular contraction *nil*, the blood tends to accumulate and stagnate in the splanchnic area. This stagnation interferes with production of secretions and ferments, leads to indigestion, flatulence, decomposition in intestinal contents and toxaemia, impaired general nutrition and neural energy. On the one hand, plethora, obesity, and protuberant abdomen may be present; or, on the other hand, anaemia, sallowness, and general emaciation, or the former may pass into the latter.

When long standing and extreme such states indeed are a "dyscrasia" or "constitutional cachexia," and it is notorious how impossible it often is to diagnose such from those cachexias which are supposed to be peculiar to grave diseases like cancer, if, indeed, there is any distinction. Belly breathing opposes the circulatory system.

12. In back breathing there is no descent of the diaphragm on the inbreath.

13. Observations for the comparisons of back and belly breathing on the throat, etc., in the living subject are described in which all the points, previously referred to and illustrated on the model, can be confirmed.

14. The crico-thyroid joints as a means of rotation of the cricoid on the thyroid probably arose in the course of evolution as an easement for increased stress, strain, and friction in the throat, the result of those spells of increased activity of the respiratory mechanisms such as the higher vertebrates experience in avoiding enemies or pursuing prey. In reptiles these joints do not exist. In aves they exist, but the larynx is not used for making voice. The respiratory rotation of the cricoid then was probably antecedent phylogenetically to its phonatory rotation. When the ancestors of mammals arrived Nature found ready to hand a mechanism of respiratory origin, and promptly seized upon it as a mechanism for mammalian phonation which has culminated in the human voice.

15. Recent chemical researches in cancerous patients show just such changes as might be expected from chronic and extreme stagnation in the portal area as occurs in extreme forms of belly breathing. Among such findings are: absence of hydrochloric acid in the gastric juice (Moore), absence of normal liver ferments (von Leyden), changes in alkalinity, haemoglobin, and corpuscles of blood (numerous observers), presence of alkaloidal poisons (Macalister and Ross).

16. Extreme degrees of belly breathing touch on the origin of cancer (in the absence of any external source of irritation) at two points:

(*a*) In the production of chronic abnormal increase of mechanical forces, intrinsically arising, and specially *irritating* and *stimulating* sites which bear the brunt of such increased forces to epithelial proliferation followed by penetration. [Although the throat only has been referred to, similar increase of mechanical force can be demonstrated to be at work on the other areas of predilection of cancer throughout the viscera.]

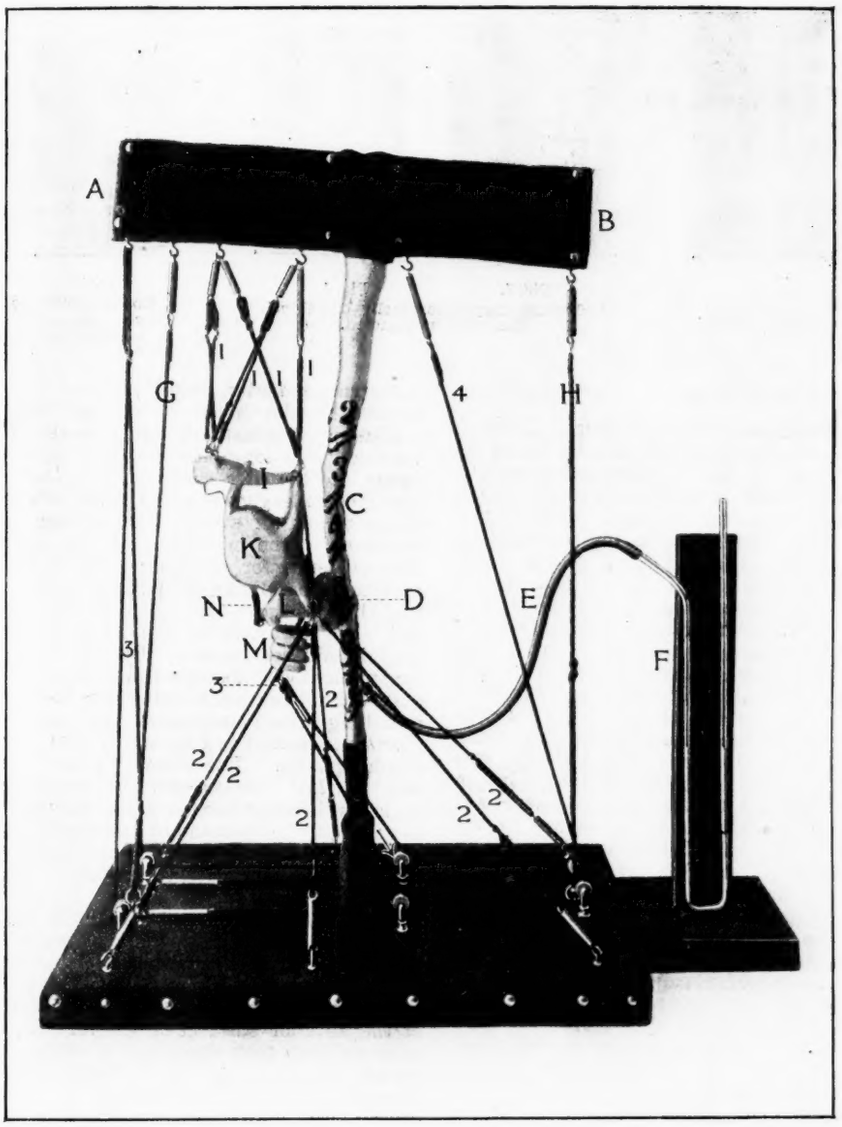
(*b*) In the production of a cachexia from chronic stagnation in the portal area.

The perfect form and physique of the ancient Greeks, moulded so by their habitual back breathing, is associated with a strong presumption of the rarity of cancer among them. For Hippocrates, who describes many common diseases with an accuracy and detail unsurpassable in the present day, dismisses the subject of carcinoma in a few lines. Surely, if such a grave and well-marked disease had been common, his keen insight into the perspective of things would have led to a different treatment of the subject in his writings.

The modern increase and prevalence of (*a*) physical degeneration of (*b*) the group containing intestinal toxaemia, enteroptosis, appendicitis, and neurasthenia, and of (*c*) cancer mortality appear to keep even step with the increase and prevalence of belly breathing, bad postural habits, and the widespread degradation of the human form to be seen around us.

Under the common habitual slouching and sitting postures tolerated by modern educationalists and society, the best use of the respiratory and postural mechanisms does not come spontaneously; or, if so, only in exceptional cases. To secure it requires precision and persistence in the training of the nerve control and co-ordination of these mechanisms until the best way is followed automatically, and during growth is stereotyped in structure. Every child could acquire it, yet to-day it seldom is acquired, for imperfect copies of correct types are accepted, to the detriment of the rising generation. Hence the fully-grown individual can seldom even *force* his body into best position without excessive strain and awkward stiffness; much less can he use his body so habitually and unconsciously with ease and grace.

The average person never acquires the correct use of postural and respiratory mechanisms, or abandons them easily from being compelled to adopt faulty methods by educational (school) or social demands (corsets, etc.), or possibly from indifference and sloth. In adult life such defects can only be corrected by arduous study, practice, and determination, and under supervision of a medical expert who has obtained some mastery, not only over the principles involved as a science, but over the practice thereof as an art. The whole matter is a great deal too grave to be left in the hands of untrained amateurs and ignorant quacks, who so largely monopolize this field of work, and form such a large proportion of — so-called—physical culturists. The medical man should prepare himself to direct and control all such work on sound lines.



Model by which the variation in effect of costal (back) and abdominal (belly) breathing on the stresses, strains, and frictions in the throat and larynx, more especially of the cricoid cartilage on the spinal column, and also the transverse axis of respiratory rotation of the cricoid on the thyroid cartilages, can be illustrated, with explanation of lettering. A, B, Horizontal bar representing base of skull; C, vertical spring representing vertebral column; D, E, F, air bag, tube, and pressure gauge; G and H, stays to keep apparatus firm; I, hyoid; L, cricoid; K, thyroid; M, trachea; N, cric. thyr. ligament; 1, 1, 1, 1, suspensors of throat from base of skull and maxilla; 2, 2, 2, stays attached to ends of transverse axis of crico-thyroid rotation; 3, 3, cords moving the trachea and cricoid *down* and *back* in a direction similar to that in which they would be pulled by the descent of the diaphragm in belly breathing; 4, cords producing movement of head backwards, such as muscles at back of neck would produce. When 3 and 4 are at work simultaneously an active rotation of cricoid on thyroid is seen. To illustrate *back* (costal) breathing, gently depress horizontal at A; then pressures are seen directly, and by pressure gauge to *lessen*. To illustrate *belly* (abdominal) breathing, gently depress B, when the cricoid is seen to press firmly on spine, the heel of the cricoid bezel to rotate vigorously, and the trachea and cricoid to descend.

These cuts are from amateur photographs of a victim of *belly* (abdominal) breathing, who is gradually acquiring *back* (costal) breathing. Technical defects as to pure profile, position of arms, and slight movement of subject and camera (though all were attempted in rapid succession without the subject leaving his standpoint, and the camera fixed on a stand) can hardly be overcome without laboratory or studio resources, combined with a docile, able and willing subject, a training of him, as well as leisure of the investigator—an association not easy to find. Though faulty, this series is the best I possess, and is more instructive than any of the fancy pictures published elsewhere. Mine are actual comparative photographs from life (negatives untouched).

The chief defects are that the pictures do not show that the subject is taller in Fig. 1 than in Fig. 2, and that Fig. 6 as well as Fig. 5 should be taller than Figs. 1, 2, 3, and 4, which is in practice the actual fact.

Fig. 1.

Fig. 2.

Abdominal respiration (belly breathing). Head drooping forwards.

Fig. 3.

Fig. 4.

Abdominal respiration (belly breathing). Head rigidly retracted.

Fig. 5.

Fig. 6.

Costal respiration (back breathing). Imperfectly performed by same subject, but indicating some of the essential points.

DISCUSSION.

Professor PETER THOMPSON (King's College, London) thought that the model shown could not be taken as illustrating what took place in the body during the various respiratory movements, since it was constructed with a view to proving certain preconceived ideas. Models made in this way were frequently responsible for perpetuating fallacies and starting fresh theories along wrong lines. Too much stress, therefore, should not be laid on the model which had been demonstrated as a proof of the movements which took place during bad abdominal breathing. He also contended that there was no "sharp" point or ridge on the anterior aspect of the vertebral column behind the oesophagus at the level of the cricoid cartilage, which would lead to irritation when the larynx was elevated and depressed. On the other hand, the beginning of the oesophagus (at the level of the cricoid cartilage) was one of the three points along the gullet where the lumen was diminished, and the fact that the pharynx narrowed down to this point, somewhat in the same way as the stomach contracted to the pylorus, was worth noting in connexion with cancer. It was difficult to believe that a physiological act like breathing, even when the type of breathing was an exaggeration along possibly abnormal lines, would lead to the production of malignant disease.

Dr. DICKEY (Belfast) asked whether the action of swallowing might not be a more important causal factor in the production of carcinoma, for two reasons: (*a*) Owing to the friction of the cricoid ascending on the vertebral column during deglutition; (*b*) owing to the passage of unmasticated food masses irritating the mucous membrane of the oesophagus at the level of the cricoid cartilage.

Mr. N. C. RUTHERFORD, (Edinburgh) referred to an interpretation of the breathing of the recumbent pregnant female put forward by Professor Geddes at Bristol, in which he showed the effect of extending the vertebral column in raising the upper ribs. Such extension must increase greatly the friction of crico-oesophageal junction on the vertebral column. If, in view of this, Dr. Scanes-Spicer could furnish statistical proof that carcinoma in the neighbourhood of the cricoid was more frequent in females who had been pregnant than in males and nulliparous females, his conclusions might perhaps be accepted.

Dr. DAVID WATERSTON (Edinburgh) pointed out some features in the construction of the model which appeared to him to fail to represent the actual state of affairs, such as the degree of obliquity of the tracheo-diaphragmatic bands, and the fact that elastic springs took the place of muscles, which would probably act in a manner quite different from springs.

Dr. SCANES-SPICER said, in reply, that the discussion had elicited just the kind of criticism that he had hoped for. He had offered his paper to this Section because he wanted the most trenchant criticism of his description of anatomical and physiological facts and reinvestigation of them independently. In reply to Professor Peter Thompson, he said that the model shown had been made by himself to illustrate qualitatively the conceptions he had formed, because for a long time he could not succeed—doubtless owing to his own lack of lucidity—in getting some esteemed colleagues to grasp what he was driving at; and the model, at all events, materialized his conception with reference to the movement of the cricoid on the spine. The evidence for or against his propositions must be obtained from living subjects, as it was in studying them that the idea arose. He objected to the term "*diaphragmatic*" as a variety of breathing, because it had been used in different senses. By the French school it was synonymous with abdominal, and in this country with lateral costal. Professor Keith had used it in a third sense as *mixed* breathing—that is, combination of costal and abdominal—in *Further Advances in Physiology, 1909*. All breathing was diaphragmatic. The terms "*back*" (costal) breathing, and "*belly*" (abdominal) breathing, represented the typically different modes which he thought it important to contrast. In speaking of "points of bone and cartilage" in his paper he was thinking of such spots as the tip of internal pterygoid plate, the styloid process, the cornua of the hyoid, horns of the thyroid, the muscular and vocal processes of the arytenoids, and the tip of tracheal cartilages, and not of the vertebral abutment. If he had used the word in connexion with the spinal column, he withdrew it. As between cricoid and spine it would be between the borders, ridges, and bosses of the bezel and the hard ridges of the anterior surfaces of the vertebrae that the undue push and rub took place, but, of course, soft tissues intervened, and it was in them that cancer developed. He thought it had been settled for twenty years that the cricoid bezel moved backwards and downwards to make tense the vocal cords in phonation, and not the thyroid on the cricoid.[1] The thyroid was fixed (Keith and others). In the *Encyclopaedia Britannica*, last edition, Professor McKendrick had accepted this and renamed the muscles thyro-cricoid. In reply to Dr. Dickey, he said that he thought stays hampered the lower costal factor in back breathing. This was compensated for in a way by upper costal and abdominal breathing, but stays rendered the abdominal wall toneless and flabby, and when taken off at night the toneless abdominal wall favoured diaphragmatic descent. He had no doubt the forced swallowing of irritating substances might cause abrasions, and frequent repetitions to such chronic irritation as might be a cause of cancer. He had seen patients with cancer of the gullet who had dated the commencement of their illness absolutely to an occasion on which an article of food stuck in the throat, but even in this case the gullet might have been constricted from cancer first. His theory by no means excluded any recognized source of chronic irritation as the local irritant, but offered an

[1] Jelennfy in Pflüger's *Archiven*, and Hooper, quoted by Morell Mackenzie in *Hygiene of the Vocal Organs*.

explanation of other irritations. With reference to Dr. Rutherford's remarks that pregnant females over-extended the cervical column and retracted the head in sleep, he was well aware of this fact, and also had read the paper which had been referred to, but thought the account of belly breathing he had given suggested the reason for this. The subject had been deprived of part of her customary breathing space, the diaphragm contracted more vigorously, and all the more pulled down the cricoid. Then the muscles of the nape tried to pull the glottis up to the air. According to Sir Felix Semon, cancer of the cricoid region—extrinsic laryngeal cancer—was far commoner in women than in men. The explanation of this which the speaker offered was, pregnancy and increased respiratory load lead to increased action of respiratory mechanism, evidenced by the retracted head. With a view to determining how statistics affected this view, he asked Sir Felix Semon how many of his female extrinsic cancers were married and how many single, and he stated that his impression was that all but one were married. He then wanted to know about pregnancy, but the determination of this would have required a prolonged search through old casebooks, and as it was a few days before Sir Felix's retirement, and the speaker had not had leisure to hunt up other records on the point, this point must be left undecided. In reply to Dr. Waterston, he did not think that the posterior surface of the bezel was evenly covered by a protecting pad of muscle. There was often a strong median ridge, and parts of the upper, and especially lower, border of the bezel covered only by their aponeurosis and mucous membrane. On a powerful rotation of the cricoid the mucous membrane over these could hardly escape a more vigorous rubbing than the rest.

PHOSPHATIDES IN THE LIGHT OF MODERN RESEARCH.

By HUGH MACLEAN, M.D.,
University of Aberdeen.

IN discussing the chemistry of the phosphatides in the light of more modern work it would seem advisable to state what is now generally meant by this term. The word "phosphatide"—which was originally applied by Thudichum to certain products he had isolated from the brain—is used to designate complex substances of a more or less fatty nature which can be extracted from the tissues by such solvents as alcohol, ether, chloroform, etc., and which on analysis can be shown to contain fatty acids, nitrogen, and phosphorus. The term "lecithans," proposed by Koch to designate such substances, has not been generally adopted.

That the phosphatides are of great importance in the vital processes is indicated by their widespread occurrence; in some form or other they constitute part of every living cell, both animal and vegetable, but their exact function and bearing in the organism is at present but little understood. That they are of importance in the causation of narcosis by many drugs (ether, $CHCl_3$, etc.) seems fairly well established. Again, their action as activators of certain haemolytic poisons has been demonstrated beyond doubt. It is likely that they play an important part on account of their physical characters, and it is not at all improbable that they have some part in the general desaturation of fatty acids that occurs in the body.

One marked characteristic of the phosphatides is the extreme readiness with which they undergo oxidation, and their highly unstable nature would seem to point to their importance in the general process of metabolism. In such highly specialized structures as the heart and brain they are specially abundant, and large quantities can as a rule be obtained from egg yolk. In the latter substance, however, the amount varies considerably, and on one occasion I obtained only a few grams from 100 eggs. Of variations in the animal body, either in health or disease, we have practically no idea; the few observations that have been made in this direction do not furnish sufficient material to draw any definite conclusions, and the difficulty experienced in the quantitative estimation of these substances renders the matter still more obscure.

The best practical classification of the phosphatides is that suggested by Thudichum, and is based on the relative content of nitrogen and phosphorus in the molecule. The following substances have been isolated:

(1) N : P : 1 : 1 = *Mono-amino-monophosphatides.* Of this group the best known are lecithin and kephalin. Another substance designated "vesalthin" has been recently isolated by Fraenkel and Pari.

(2) N : P : 2 : 1 = *Diamino-monophosphatides.* Sphingomyelin isolated from brain by Thudichum.

(3) N : P : 3 : 1 = *Triamino-monophosphatides.* Only one substance of this nature has so far been isolated; its discoverers, Fraenkel and Bolaffia, have given it the name "*Neottin.*"

(4) N : P : 3 : 2 = *Triamino-diphosphatides.* Such a substance is said to have been obtained from ox kidney.

(5) N : P : 1 : 2 = *Mono-amino-diphosphatides.* Cuorin from heart by Erlandsen, and a somewhat similar substance from eggs by the writer.

Lecithin.

With regard to all these substances, the best known is the mono-amino-monophosphatide lecithin. According to Strecker and Diaconow, lecithin is an ester compound of glycophosphoric acid substituted by two fatty acid radicles and a base choline. This formula, derived from a consideration of the results of elementary analysis and the cleavage products obtained on hydrolysis, has been generally accepted. From this formula it is obvious that the total amount of nitrogen present in lecithin is found in the choline part. Many experiments have been made with more or less pure lecithin in order to determine what amount of choline could be recovered, the theoretical yield being calculated on the nitrogen present. The results are rather striking, as Erlandsen from pure heart lecithin obtained only 42 per cent., and Heffter from liver lecithin only 25 per cent. These results suggest either that part of the choline was destroyed during the process of hydrolysis of the lecithin, or that all the nitrogen found on analysis was not really present in the form of choline.

In investigating this part of the subject a great number of experiments were carried out under different conditions in order to ascertain whether any destruction of choline really took place. The result arrived at was that under conditions as nearly as possible the same as those under which lecithin was hydrolysed practically no destruction took place. In one experiment in which excess of all the known cleavage products of lecithin were mixed with a known quantity of choline and boiled with $Ba(OH)_2$ for several hours, 95 per cent. of the choline was recovered as the double platinum salt. Since excess of fatty acids, etc., was used, the small loss of 5 per cent. was easily accounted for owing to the extreme difficulty of washing the precipitates quite free from choline.

Since, therefore, no destruction of choline could be ascertained, it must be assumed that when lecithin is hydrolysed destruction of choline does not account for the low yield obtained. Investigation of other possibilities, such as incomplete splitting up of the lecithin, showed that when boiled with 5 per cent. $Ba(OH)_2$ in methyl-alcohol hydrolysis was complete in from one to two hours.

In one experiment hydrolysis with a saturated watery solution of $Ba(OH)_2$ was carried on for eighteen hours without any material change in the final yield. The results of all these experiments pointed strongly to the probability that all the nitrogen of lecithin was not present in the form of choline or other such-like base.

Lecithin was now prepared from different substances by the method utilized by Erlandsen, in which the tissue is first dried and then extracted with ether and subsequently with alcohol. Eggs and heart muscle were extracted, the ethereal product only being used. By means of several manipulations the lecithin was obtained in as pure a state as possible; it was then analysed, and the choline obtained by hydrolysis and precipitation with platinum chloride, estimated in terms of the nitrogen present. Both lecithins showed a N : P proportion as practically 1 : 1, and were in fairly close agreement in their elementary analyses. In the case of heart lecithin the figures were practically identical with those obtained by Erlandsen for a similar substance. The egg lecithin agreed with the analysis of a similarly prepared substance by Stern and Thierfelder. On hydrolysis, however, it was found that heart lecithin gave quite a different result from egg lecithin, for while the latter yielded about 60 per cent. of the theoretical choline, only about 42 per cent. was obtained from heart lecithin.

Again, in a trade lecithin such a high figure as 80 per cent. was obtained. Thus, in three different lecithins in which the N : P value was almost exactly 1 : 1, and all of which had been purified several times and hydrolysed in exactly the same way, such different figures as 42 per cent., 60 per cent., and 80 per cent. were obtained. These experiments were repeated with different reagents for splitting off the choline, such as saturated H_2O solution of $Ba(OH)_2$; saturated solution of $Ba(OH)_2$ in methyl-alcohol—mineral acids such as H_2SO_4 and HCl—but always with the same result.

From these experiments it is certain that those different substances cannot be identical chemically, despite their fairly close approximation from the point of view of elementary analyses.

Again, in the case of egg lecithin it was found that the cadmium chloride salt gave a larger yield of choline, calculated on the N present, than did the lecithin itself. The increase amounted to about 10 per cent. If all the nitrogen of the lecithin were really present as choline, it is difficult to account for such a result. In the course of separation of the salt a residue was obtained containing nitrogen which was not present as choline.

Part of the nitrogen unaccounted for is found in certain of the residues that form during hydrolysis. Thus, after heating with, say, saturated H_2O solution of $Ba(OH)_2$, and allowing to stand, a residue separates out. It seems quite impossible to wash this residue free from nitrogen. Such residual nitrogen, however, amounts to but a small percentage of the whole, and by far the major part is found in the final alcoholic solution from which the choline has been precipitated by platinum chloride. The choline platinum chloride being filtered off, the filtrate is found to contain most of the lost nitrogen. Concentration of these filtrates after separation of platinum gave on the addition of more platinum chloride little or no result. Winterstein and Schultze, however, say that by adopting this method they have succeeded in separating a new base from plant lecithin. In the case of their lecithin the percentage yield of choline was exceedingly low, and they also say that in plant lecithin, at any rate, only a small part of the N is represented by choline. Some time before Winterstein and Schultze's paper appeared I carried out similar experiments with egg lecithin, using a large quantity. After hydrolysis with $Ba(OH)_2$, and separation of the products of decomposition, the choline was obtained in alcoholic solution and precipitated by alcoholic platinum chloride. Filtrate was then treated with H_2S, filtered, and the filtrate evaporated to small bulk; again alcoholic solution of platinum chloride was added, and, as in the case of Winterstein and Schultze, a dense precipitate was obtained. On analysis, however, the precipitate turned out to be barium-platinum-chloride. In no case was any organic substance of basic nature found.

The conclusion that must be arrived at from these investigations is that lecithin is really not the relatively simple compound that it is said to be, and that the present formula is quite inadequate. That all the nitrogen present is not present in the form of choline; and, further, that lecithins derived from different tissues, though showing somewhat similar results on elementary analyses, are not identical substances.

Kephalin and Vesalthin.

With regard to the other substances of this group, kephalin and vesalthin, it can only be said that the former requires much more investigation; it seems to yield on hydrolysis the same cleavage products as lecithin, only there remains some doubt with regard to the base present. Koch could obtain no choline, but obtained another base, while Cousin obtained only choline. Vesalthin is said to furnish a base different from choline.

Substances of other Groups.

In Group II, substances with N : P as 2 : 1 (diamino-monophosphatides), the chief representative is sphingomyelin; it was first obtained by Thudichum and isolated as a crystalline white substance; it is present in the so-called protagon. Erlandsen isolated a similar substance from heart muscle, and Stern and Thierfelder from egg yolk; it is not known what the base (or bases) present are. In Group III, N : P=3 : 1 triaminomonophosphatide; and Group IV, N : P=3 : 2 triaminodiphosphatide, as mentioned above, only one substance representing each group has been isolated; it is very doubtful how far these are mixtures of simpler phosphatides.

Substances, however, belonging to the last group are fairly well characterized. They contain N : P as 1 : 2 mono-aminodiphosphatides, the chief representative being cuorin, isolated by Erlandsen from heart muscle, and a somewhat similar substance which I isolated from egg yolk.

Both these substances are similar in general properties, but differ to a slight extent in composition; they yield as cleavage products fatty acids and glycerophosphoric acid, but no choline.

Erlandsen obtained in the case of his product a small amount of a substance precipitated by platinum chloride, while from my substance no satisfactory evidence of any basic body precipitated by platinum chloride could be obtained. Both substances are highly unsaturated, and on account of their great tendency to oxidation are difficult to work with.

The Nature of the Nitrogen Combination.

In all these phosphatides one great difficulty seems to be to account for the manner in which the N is combined. The only base of the presence of which no doubt remains is choline, but choline is present only in very few of the phosphatides, perhaps in lecithin alone; and even here we saw that it does not nearly account for all the nitrogen present; perhaps in many of these the nitrogen is partly present as amino acid. So far they all seem to yield glycerophosphoric acid and fatty acids, and in all lecithins it would seem that some of this fatty acid at least is present in an unsaturated form. In ordinary lecithins perhaps oleic acid is the chief one present, but such substances as cuorin undoubtedly contain fatty acids of a more unsaturated nature. It is exceedingly doubtful if such a substance as the saturated distearyl lecithin of the textbooks really exists; almost certainly it does not. Again, the method of preparation of the lecithins utilized by Strecker and Diaconow would almost certainly result in the substance obtained being a mixture of phosphatides, so that there is a strong probability that the substance from which our present generally accepted formula was deduced was itself not a pure substance, but a mixture. Indeed, it seems certain that a pure lecithin conforming to the theoretical formula, if it really exists, has never been isolated. The lecithin obtained by the best methods at our disposal to-day has probably never been isolated pure, and may be a mixture of two or more substances. In short, our knowledge of the phosphatides is really no more exact than our knowledge of the proteins, and at present we may say of the phosphatides, as of the proteins, that we do not yet know the structure of a single one of them, and that in no single case have we a complete list of their hydrolytic cleavage products.

DISCUSSION.

Professor B. MOORE (Liverpool) referred to the value of a detailed study of the phosphatides in relation to important functions of the cell, and pointed out that specific haemolysins, etc., might owe their properties to certain specific phosphatides possessing varying groups of a basic character. Further, that the processes of desalivation of fats in the liver and elsewhere, and of fabrication of amides, as in the suprarenal gland, might be the work of phosphatides, the salivated fatty radicles or amido-acids entering first into labile combination, and in the dynamics of molecular change being set free in other forms.

Dr. REID HUNT (Washington) asked if variations in the structure of the "choline" part of the molecule—whether, for example, if the compound contained ethyl or propyl groups instead of methyl groups, or an oxy-propyl instead of the oxy-ethyl group, some of these discrepancies could be explained. The speaker and Mr. Taveau had prepared a large number of such compounds, and there was some reason for thinking that some such compounds occurred in certain organs of the body.

Professor T. H. MILROY (Belfast) asked Dr. Maclean whether he had investigated the physiological action of the nitrogen-holding alcoholic filtrate from the platinic chloride choline precipitate. He also suggested that in all probability important changes in the phosphatides might be observed during the early stages of myelination.

DISCUSSION ON THE DEEP AFFERENTS: THEIR FUNCTION AND DISTRIBUTION.

OPENING PAPER.

By C. S. SHERRINGTON, M.D., D.Sc., F.R.S.,
Holt Professor of Physiology, University of Liverpool.

PROFESSOR C. S. SHERRINGTON, in opening the discussion, said that while our knowledge of the superficial afferents was considerable, we knew relatively little with regard to the deep afferents. Once inside the surface sheet, the anatomy and functions of the afferent system became very obscure.

1. VISCERAL AFFERENTS.

In one sense the visceral afferents were superficial in relation to the surface of the alimentary canal and air passages, but practically this fact may be neglected.

When we took food it normally disappeared from our ken after its passage through the fauces. That fact was very suggestive, for it meant that beyond a certain point there was no normal field of consciousness, the consciousness of the body being practically limited to the external surface. Beyond the fauces conscious sensation ceased, and consequently personal experience might lead us to doubt the probability of the existence of visceral afferents; but dim sensations could be elicited under certain conditions—for example, after drinking hot fluids.

The mouth or portal was an intermediate field between the external surface of the body and the interior of the alimentary canal. One found that in this region the character of the effective stimuli became altered. The chemical stimuli, both olfactory and gustatory, became specially effective, both in the direction of yielding sensations and inducing reflexes.

Formerly the mechanical and chemical stimulation of deep afferent nerves, although nominally not associated with sensation, was believed to influence gastric and intestinal movements. There were a number of difficulties in the way of accepting this view. One found that the simple pendulum and the more powerful and less frequent peristaltic intestinal movements took place in an isolated loop of intestine after section of all the nerves passing to the loop. In this case there could not only be no conscious reaction, but even no reflex action. Further, removal of the abdominal sympathetic in the dog did not cause any obvious alteration in digestion or movements. Auerbach's and Meissner's plexuses apparently acted satisfactorily after severance of all connexions with the rest of the nervous system.

The Quality of the Effective Stimuli.

Herrick's experiments had shown that gustatory reactions may be obtained with great sharpness from points on the external surface of the head of the fish, especially the ventals. In certain fish even weak stimuli of a chemical nature (for example, a dilute solution of quinine) were effective when applied to any part of the skin surface, although specially effective at certain points. The working of the alimentary canal might be viewed as being integrated and co-ordinated by means of such chemical stimuli acting through a nervous mechanism.

A most interesting phase of recent physiology was the suggestion by Bayliss and Starling of a mode of chemical regulation other than that through the nervous system, namely, by means of the hormones. These substances could be extracted from certain tissues, and were capable of exciting the activity of correlated organs. The following were some examples of these substances: Secretin and a substance extracted from the cardiac end of the stomach which was capable of acting on the pyloric end. Carbon dioxide was a hormone specially affecting the bulbar respiratory centre. One saw that Pawlow's view that such coadjustments were nervous in origin was rendered doubtful. Bayliss and Starling showed that after severance of all nervous connexions secretin was still effective.

Pain in Viscera.

This subject had long formed a field of controversy. Haller distinguished parts which feel from those which do not feel. He included the viscera, tendons, and blood vessels in the latter class. Haller worked largely with human subjects under conditions which were now impossible, namely, on patients not under the influence of an anaesthetic. He also experimented on animals. The methods used were extreme—for example, isolation of organs and effect of corrosives. Bichet arrived at similar conclusions to those of Haller.

According to Lennander, viscera did not feel, and the peritoneum was non-sensitive. The subserous layer, on the other hand, was a bed of nerve endings, and at the root of the mesentery a similar sort of arrangement existed. According to Lennander, all the pain associated with the abdominal organs was referred to these two layers.

On this question of pain in viscera there was a remarkable opposition of opinion. According to Meltzer, the liver and intestines were sensitive and normally give reactions as pain. Professor Sherrington himself was inclined to believe that there must be some sensation, since reactions could be obtained by acting on the sympathetic system going to viscera. There resulted, for example, vasomotor reactions, a rise of blood pressure, and it was difficult to believe that there was no sensation associated with this phenomenon. But as the animals were anaesthetized it was impossible to be certain about it.

Again, Head and Mackenzie were widely apart on the question of visceral pain. According to Head, there was visceral pain, whilst Mackenzie denied that a viscus was even tender, and believed that the pain in visceral disease was a referred pain. The parietal pleura, for example, was never the seat of pain, the pain being due to a cramp of the muscles of the thoracic wall.

2. DEEP CARDIAC AFFERENTS.

Deep afferents from the heart could be regarded as a kind of half-way house between those of the visceral system and those of the muscular or somatic system. The depressor nerve took its origin as an afferent nerve from the root of the aorta. It influenced tone. Could the depressor nerve give rise to sensation? In the sympathetic nervous system the afferent fibres were extraordinarily few, whilst the efferent fibres were considerable in number.

3. SOMATIC AFFERENTS.

Professor Sherrington next dealt with those deep afferents which were not visceral, but which were deep—that is, "deep touches." These deep touches were registered by muscular nerves. Nerve fibres going to muscle were heavily laden with afferent fibres—more than half. At the point where the muscle passed into the tendon a regular nest of afferent fibres was found, and in the tendon itself Golgi's organ occurred, which, again, was an afferent structure. Which group was involved in Head's deep touch was not known. In considering tonus it was pointed out that it occurred, generally speaking, in those muscles which antagonized gravity. Tonus occurred in extensor muscles, and it might occur in the flexors too, but there was no proof of this. What was wrong with the deep afferents in tabes? An answer to this question would explain the symptoms of the disease, but no one as yet knew what ataxy really was.

PROBLEMS OF THE FUTURE.

In conclusion, the speaker observed that the whole system of afferents formed an important group, for a study of which clinicians, physiologists, and anatomists might combine and attack certain problems, such as (1) the distribution of afferent nerves in muscles of different type and shape; and (2) the distribution of visceral afferents concerning which there were so many discrepancies.

DISCUSSION.

Professor A. F. DIXON (Trinity College, Dublin) drew attention to the difficulty in some cases in distinguishing anatomically between afferent somatic and afferent visceral fibres. For example, at the anterior end of the alimentary canal there were in certain branches of the fifth nerve somatic afferent fibres supplying visceral surfaces, and in lower animals (certain fishes, etc.) there were splanchnic nerve fibres, such as those connected with the fifth and seventh nerves, supplying the skin.

Professor J. S. Macdonald (University of Sheffield) asked whether the question of increased central excitability in the neurones of a segment of the cord had not been deemed to be the factor varied in conditions determining reflex pain. Also as to whether the experiments of Langley had not done, after all, no more than show that there was no distinction between afferent and efferent fibres in this case, most notably no distinction in their connexion with cells? Was it not the case that unicellular reflexes were still debatable probabilities? The question might be reinforced by reference to Bayliss's experimental production of vaso-dilatation on stimulation of posterior root fibres usually regarded as pure afferents. He regretted that Professor Sherrington had not more freely pointed his remarks by illustrations from his own experimental work, giving some reasons for suggesting that there were good grounds for supposing the existence of three different sets of afferents affected by quite different forms of stimuli, one set dominating tone affected only by variations in elastic structures; a second in the tendon, comparable to the depressor from the aorta—the tendon of cardiac muscle—stimulated by forced extension and developing a protective relaxation; and, last, a third set of afferents, probably commencing in the neuro-muscular spindles affected by electrical change, and subserving the interest of extremely rapid contractions, such as occur in speaking and writing.

Dr. Haddon (Denholm) said his attention had been directed to the question discussed by Professor Sherrington by studying diet. He had asked Professor Ferrier some years ago where he could find what was known as to the sensitive centres, and was told that the subject had still to be investigated. He came hoping to learn something on the subject, and he had not altogether been disappointed, because Professor Sherrington, who was the chief authority, had confessed his ignorance of the subject, and when they knew their ignorance they were making progress. He pointed out that they might study the question by accumulating clinical facts and generalizing from them, as well as by experiment on nerves, and he made the following statement:

1. That food in the stomach prevents a man doing either his best muscular or mental effort.
2. That endurance is greater in vegetarians than in those who eat animal food.
3. That stimulants improve both muscular and mental effort.
4. That stimulants are eliminants.
5. That exercise, making the skin and lungs act, as in climbing, improves the mental power, or clears the brain.

If these facts and others which might be met with could be explained, or even a theory formed to explain them, it might help experimental physiologists in their work. He concluded that wherever the sensitive centres might be situated or however they might be reached, the chemical constitution of the lymph (like the solution in the electric battery) affected their action very powerfully, and that it depended not upon the food eaten, but upon the action of the nerve centres which preside over the whole digestive system.

Dr. T. Graham Brown (Edinburgh), in comparing reflexes elicited from deep and from superficial afferent nerves, mentioned a peculiar case of "scratch reflex," which seemed to hint that the clonic "beats" were due to the presence of discontinuous periods of inhibition superposed on a state of continuous contraction.

Mr. N. C. Rutherford (Edinburgh) referred to the work of R. G. Harrison of Yale on *Embryonic Transplantation and Development of the Central Nervous System*, lately published, in which he actually watched the growth of motor and sensory fibres. His results would explain fully the formation of the sensory end organs on an embryological basis. With reference to herpes zoster, the fact that its distribution did not correspond exactly with the area supplied by the affected spinal ganglion might perhaps be explained on the basis of the continuous and far-reaching subepithelial plexus providing overflow channels. This would differ from the segmentation explanation put forward by Head for the lack of correspondence between the distribution of herpes and that of the spinal ganglion. He was unable to understand how exciting visceral sensory terminals could, by heightening the excitability of the corresponding spinal ganglion or cord segment, produce an effect in consciousness at a much higher level in the central nervous system, unless either Muller's law of isolated conduction broke down or there was a central representation of the visceral sensory areas in the cerebrum, where they were in connexion by association tracts with those areas representing cutaneous sense of pain.

RECONSTRUCTION MODELS OF THE FETAL PELVIS, Etc

By David Waterston, M.D.,
Senior Demonstrator of Anatomy, University of Edinburgh.

Dr. Waterston exhibited and demonstrated some reconstruction models of the fetal pelvis which had been constructed under his supervision by Dr. Pattie. The stages of development which were represented filled in the gap between the earliest stages of the formation of the pelvis studied by Bardeen, Peterson, and others, and the later stages described by Professor Arthur Thomson and Fehling. The observations were directed first to the study of the mode of growth of the pelvis, and they showed that the embryonic pelvis at the tenth week, when all the parts were laid down, was not a model in miniature of the pelvis at birth. Only by a series of changes produced by unequal growth was the infantile form attained. Thus the sacrum was relatively wide and long, the coccyx long, and the width was small. The existence of sex characters could not be determined, as all the specimens proved to be males. Attention was directed to the condition of the pelvic viscera and of the pelvic musculature. The anal canal had not developed, and the rectum opened directly forward upon the perineum immediately in front of the coccyx. The development of the anal canal depended upon a regression of the coccyx and the sinking down of the genito-urinary apparatus into the anterior half of the pelvis. The bladder was largely extrapelvic, and the openings of the ureters lay at the level of the crest of the pubis. The urethra opened in the perineum, at the root of the genital eminence, but that structure showed that it was being tunnelled by an ingrowth of the epithelium of the urethra.

[Dr. Waterston also exhibited and demonstrated Lissauer's instrument for taking outline tracings of the skull in various planes, and also Martin's kuluscraniophore, and an improved form of Matthew's periglyph.]

A REPLY TO CERTAIN CRITICISMS OF OBSERVATIONS AS TO THE EFFECTS OF INHALATION OF OXYGEN ON MUSCULAR EXERTION.

By Leonard Hill, M.B., F.R.S.

[The following note was read for the author by Dr. J. A. Milroy (one of the Honorary Secretaries of the Section).]

In the *Proceedings of the Physiological Society* (June 26th, 1909) Haldane and Douglas give the results of a very few observations on themselves of the effects of running twice up and down a 40 ft. flight of stairs after forcibly breathing air for three minutes or quietly breathing oxygen, and conclude that "Hill's recent observations as to the effects of previous inhalation of oxygen in diminishing the distress caused by muscular exertion can be explained as a result of the deep breathing which is apt to occur in persons to whom oxygen is administered." My answer to this is, first, that forced breathing has a profound effect on the circulation, and therefore it is not just to contrast forced breathing of air with quiet breathing of oxygen. Secondly, that the exertion carried out by Haldane and Douglas was not sufficient to lower the tension of oxygen to that level where want of oxygen comes into play. Thirdly, in our experiments on giving oxygen to horses between hill-climbs and to boxers between the bouts of a fight, there was no question of conscious forced breathing. The exhausted horse or boxer was gasping, and oxygen restored them, not air. Fourthly, for a great runner like Mr. Just to take four seconds off his best trial time, and break his actual record time, and Mr. Holding to take a second off his record time for the quarter-mile in unpaced trials, are extraordinary feats, which I challenge Haldane and Douglas to get athletes to repeat by the forced breathing of air.

Forced breathing before races has been and is tried by athletes, and would be a universal custom if it benefited them to this extent.

Haldane and Douglas quote the authority of Zuntz against me as "definitely against the theory that oxygen is stored in the body when pure oxygen is breathed." I have never accepted the view that the tissues combine with and store oxygen in the form of an energy-producing material. If we take the blood quantum as 5 3 per cent. of the body-weight (Plesch, who confirms Haldane), and suppose that the arterial is one-third and the venous two-thirds of the whole, and that the arterial contains 18.5 per cent. O_2 against 12 per cent. in the venous blood; if we take it there is about 0.5 per cent O_2 in simply solution in all the body fluids and about 6 per cent. in the fat; if we put fat against dry bone, as Haldane does, in dealing with the solution of N_2 in the body, and take the whole body-weight as containing 0.5 per cent. O_2 in simple solution; then on forcibly inhaling pure oxygen most of the venous blood will become arterial, and much of the body will contain 2.5 per cent. O_2 in place of 0 5 per cent. in solution. From these considerations it follows that the athlete can easily take into his body an extra 1,000 or 1,200 c.cm. O_2, and in addition fill his lungs with some 3,000 to 4,000 c.cm. O_2 before starting to run, besides washing out the CO_2 from his body. Many sprinters run 100 yards, and some 120 yards without a breath. Is it not plain that oxygen must enable them to run further without a breath and give them the mechanical advantage of not breathing?

To test Haldane and Douglas's conclusion two medical athletes have kindly run for me successive runs after forced breathing of air or oxygen for three minutes, and with the short interval of thirty minutes between the runs.

P. T. ('Varsity blue), out of form. Race, 250 yards, unpaced.

AIR.

Pulse-rate.	Time of Run.	Condition.
68	—	Normal.
148	29⅗ sec.	Immediately after race. Vomited and had severe gastric disturbance.

OXYGEN.

128	28 sec.	Immediately after race. Pulse very full and strong, and face very good colour. Felt he ran better. Afterwards vomited again.

C. T., half-mile runner of repute, out of form. Race, half-mile, paced last 250 yards.

AIR.

Pulse-rate.	Blood Pressure.	Time of Run.	Condition.
66	125	—	Normal.
165-170	70-80	2.14⅘	Immediately after. Very much done, pulse weak and irreguiar, difficult to count. Wants to bend down.
146	110	—	One minute later.

OXYGEN.

128	120-5	2.16	Not nearly so done. Holds himself upright. Much better colour. Pulse notably fuller and stronger. Says his legs gave out. Feels fit to run again.
132	—	—	A minute later.

C. T. A week later. Half-mile, entirely unpaced.

OXYGEN.

Pulse-rate.	Blood Pressure.	Time of Run.	Condition.
148	140-5	2.12⅘	Immediately after run. Held himself upright; not so done as after first race last week. Pulse regular and strong.
132	—	—	After one minute.

AIR.

160	125	2.21	Immediately after run. Pulse regular. Legs gave out. Not so done as first race last week.
152	—	—	After one minute.

These gentlemen were quite unbiassed, and each time ran themselves out to the utmost. Their times and pulse, feelings and appearance were all in favour of the beneficial effect of oxygen.

Breathing oxygen from a mask, and air in the open way, is disadvantageous to the oxygen test from the point of view of washing out CO_2, owing to the dead space in the mask.

I have used a wide mouthpiece fitted with mica valves, and very small dead space to make the conditions the same, and have breathed compressed oxygen or air from a bag containing water to moisten the gas.

I find by experiments on myself and three other subjects — S. G., A. W., and M. G. — that forced breathing of air after thirty to sixty seconds, becomes, as is well known, very unpleasant, with feelings of constriction round the head and numbness in the limbs; and in M. G. subjective sensations in the eyes and ears. Associated with this is a considerable acceleration of the heart and fall of blood pressure. The blood pressure falls particularly in the systole during inspiration, so that there is a considerable oscillation of pressure occurring with the forced breathing. The pulse becomes small and weak. These symptoms occur only at the beginning, and to a very slight degree on the forced breathing of oxygen. The blood pressure oscillates, it is true, but the pulse is strong and the pressure becomes raised under the influence of oxygen.

It is possible to continue the forced breathing of oxygen any time until mere fatigue of the muscles puts an end to it, and no Cheyne-Stokes respiration occurs, as is the tendency with forced breathing of air. All four of us have been able to hold our breath very much longer after forcibly breathing oxygen than air: myself five minutes, in perfect comfort; M. G., seven minutes; A. W., seven minutes, against about two minutes after forcibly breathing air.

Taking forced breathing as the test type of exercise, I find oxygen inhalation enables one to carry it out with far more comfort and energy. The symptoms produced by forced breathing of air are, I believe, due to the mechanical effect on the circulation, which lowers the blood pressure and leads to an actual want of oxygen in the brain. The face and hand of the subject who forcibly breathes air may become congested and livid, while he who breathes oxygen is of excellent colour.

Exact records are being kept of similar experiments I am carrying out with the co-operation of Dr. James Mackenzie, and they will be published in due course.

THE STRUCTURE OF THE PANCREAS IN RELATION TO FUNCTION.

BY

J. STRICKLAND GOODALL, and H. G. EARLE,

M.B.Lond., M.S.A. B.A.Cantab.

(From the Physiological Department, Middlesex Hospital.)

HISTOLOGICALLY the pancreas in Elasmobranchs exhibits the same essential structure as in other vertebrates, showing well-differentiated zymogenous tissue, islets, and ducts, these being bound together by connective tissue containing blood vessels, nerves, and lymphatics to form the compact gland.

The zymogenous tissue consists of a number of elongated tubular acini which have no very definite basement membrane. Each acinus is composed of a single layer of polyhedral cells which are differentiated into an inner granular acidophile zone, which stains well with eosin, fuchsin, and other similar dyes, and an outer non-granular basophile zone which stains well with methylene-blue and other allied stains. This basophile zone contains a vesicular nucleus which is invariably characterized by the presence of a centrally placed eosin-staining nucleolus (Fig. 1). The granules in the inner zone vary considerably in size and in staining reaction, and are arranged in a wedge-shape manner, the apex of the wedge being

towards the nucleus of the cell, while the base forms the free edge and lines the lumen of the acinus (Fig. 3 E). This zone is much less dense in structure than the basophile zone, which stains more or less uniformly, always contains the nucleus of the cell, and is prolonged up so as to partially embrace and envelop the eosinophile zone, thus presenting an appearance very similar to a goblet cell, the eosinophile granules forming the contents of the goblet. This prolongation of the basophile substance towards the lumen of the acinus causes specimens stained with methylene blue alone to exhibit an appearance somewhat similar to the demilunes of the salivary glands. The nucleus of the zymogenous tissue is quite characteristic, and enables one to distinguish at a glance between zymogenous, islet, and duct cells. It consists of a definite nuclear membrane, immediately beneath which is a series of small particles of chromatin which give the membrane a beaded appearance. In the centre is a spherical nucleolus which stains faintly with eosin, while placed around this nucleolus are four to six small irregularly spherical masses of chromatin (Fig. 3 E). Occasionally in the acini, cells may be seen which are not differentiated into zones, and which either have no affinity for acid or basic dyes, or stain with either eosin or methylene blue alone. Finally, in the lumina of the acini, small cells (centro-acinar cells) may be found; these vary in shape, size, and general form, and seem to be either (1) desquamated duct cells, (2) leucocytes, (3) special cells continuous with those lining the small ducts, or (4) very rarely, extruded nuclei from the zymogenous cells themselves.

The islet tissue is easily recognized in all the fishes examined by us, and occurs either as definite circumscribed areas or as diffuse strands of tissue passing in between the zymogenous tubules. In *Mustelus vulgaris* the islets in some regions appear to be specially related to the larger ducts which may be seen embedded more or less in the centre of a mass of islet tissue. Typically the islet tissue is made up of indefinitely arranged cells, or rather nuclei, usually of ovoid, but very frequently of irregular and indefinite shapes, crescentic or kidney-shaped forms being very common. All forms are, however, characterized by their poorness in chromatin, which is arranged in a loosely reticular form. (Fig. 3 G) They never exhibit an eosin-staining nucleolus, and in none of the specimens examined by us could definite karyokinetic figures be made out. Mingled with these badly staining nuclei are small cells containing definite eosinophile granules and a small spherical, deeply-staining nucleus very rich in chromatin. In addition to these, very large, more or less oval cells with large eosinophile granules and oval nuclei, which contain a reticular network and a spherical eosin-staining nucleolus, occur, as also do large cells free from granules, and having no affinity for either basic or acid stains. Lastly, irregular patches of zymogenous cells (Fig. 2), or more frequently the basal zones of zymogenous cells, are also frequently seen in the islet, such patches of cells being quite isolated and surrounded by islet cells, and being obviously in a state of conversion into islet tissue. Stained by Beckton's method, other small nucleated cells rich in fine granules can be made out.

The ducts form, perhaps, the most interesting part of the specimen, as they appear to be centres of active growth in the gland, and are most intimately associated with both zymogenous and islet tissues. As generally seen in *Mustelus*, the ducts appear surrounded by islet cells, and are lined by a single layer of large, clear, non-granular columnar cells, the free edge of which is irregular (Figs. 1 and 3). The nuclei of these cells are very large, ovoid in shape, and contain little chromatin, which is arranged to form a very loose reticulum. The nuclear membrane is thickened up periodically, so as to present a moniliform appearance; a nucleolus is present (Fig. 3 F). Occasionally in the wall of a typical duct two or three zymogenous zonal cells are found, forming an integral part of the duct wall (Fig. 3), while in other places, again, smaller ducts may be seen, composed of a double layer of cells (Fig. 1 C)—an inner, of more or less cubical cells, with spherical nuclei rich in chromatin, and an outer row, composed of very large granular eosinophile cells—similar cells being frequently seen in the outer walls of the larger ducts and in the islets. The largest ducts have a very thick external connective tissue coat, while numerous small zymogenous tubules can be seen budding out from them in places. Although the above tissues are all quite distinct and well differentiated in places, duct, zymogenous, and islet tissues may be seen passing the one into the other, a direct continuity of structure thus existing (Fig. 4). Finally we may, perhaps, point out that the above specimens should be of special interest, as they are relatively easy to obtain and prepare and represent a true picture of the *physiological* condition of the gland, not a pathological or even a hyperphysiological one. We should like to express our best thanks to Mr. R. W. Annison for his most valuable assistance in preparing the specimens used in the demonstration.

SIGNIFICANCE OF STRUCTURE.

It is perhaps a truism that the structure and development of an organ are the primary guides to its function. As far as histology is concerned, however, this axiom seems to be in jeopardy for two reasons: First, because many of the appearances seen in microscopic specimens are due to the technique employed—that is to say, are artefacts. Secondly, because owing to the recent method of reconstructing serial sections by the Born wax-plate method, the structure presented by a single section, existing, as it does, in only two dimensions, is not considered reliable.

With regard to the question of artefacts, although it is important to recognize their existence, it is equally important to realize that they may be valuable guides to structure, especially in relation to function. For instance, the granules described by Nissl in nerve cells are produced only by certain fixing agents, yet no one will deny their great importance in indicating the functional condition of the nerve cell at the time of fixation.

The method of reconstruction is, perhaps, necessary if one desires to get a clear mental picture of the histology of an organ. It can never replace, however, the study of single sections, and from considerations of time is in many cases impossible.

With regard to the pancreas, it has been conclusively proved that the acini and ducts, like those of other tubulo-racemose glands, are concerned with the secretion of pancreatic juice and its conduction to the gut surface. The question that we have to decide is the significance of the islets. It was first suggested by Laguesse, and afterwards by Schäfer and others, that they were connected with the internal secretion of the pancreas, since they were absent from the salivary glands, removal of which had no influence on general metabolism, Although a great deal of work has been done with the idea of proving this view, there is very little convincing evidence that the islets have any more to do with metabolism than the zymogenous tissue. It is true that in some cases of diabetes the islets have been found to be exclusively diseased, but then in some, the acini alone are involved, in others both are attacked, while in others still there is no lesion at all of the pancreas, and the disease is purely functional. Still, the fact of their existence in the pancreas and their absence from the salivary glands forces us to believe that they have something to do with internal secretion; and one cannot help feeling that a grasp of the significance of this tissue is bound to throw strong light on the problems of carbohydrate metabolism and the pathology of diabetes.

With regard to the nature of the islets, two main views seem to exist. Some regard them as constituting an independent organ, responsible for carbohydrate metabolism, and having no more relation to the zymogenous tissue than the medulla has to the cortex of the suprarenal gland. Others, on the other hand, hold that the two issues are closely related, the islets arising from the acini as a result of exhaustion, and under favourable conditions reconverted into zymogenous tissue. It is important that we should try and arrive at a decision as to which is the correct view, for if the two tissues are continuous, then it follows that the secretion of pancreatic juice must have an important influence on carbohydrate metabolism. It is true that interference with the flow of juice into the gut does not produce glycosuria, but too much may be deduced from this experiment. The condition is comparable to a muscle trying to contract against a load that it cannot lift.

The present communication furnishes evidence in favour of the view expressing continuity of structure in the pancreas. We have already considered the purely physio-

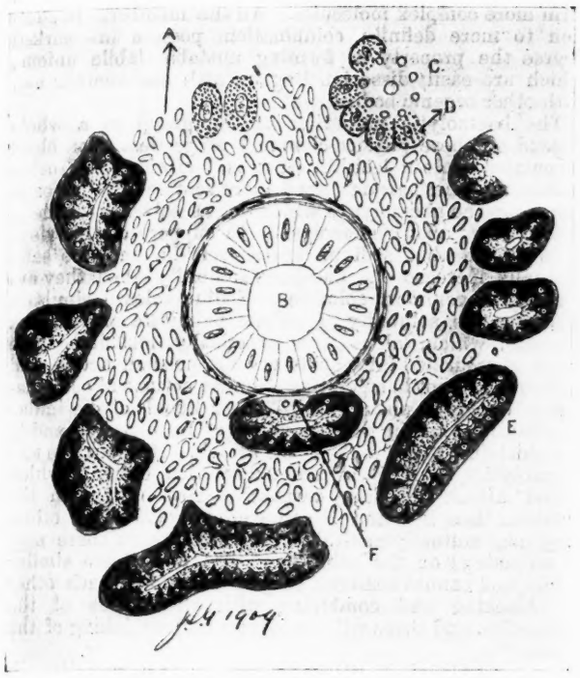


Fig. 1.—Pancreas of *Mustelus vulgaris*. A, Islet cells; B, duct; C, small duct; D, eosinophile cells; E, zymogenous tubules; F, non-staining cell.

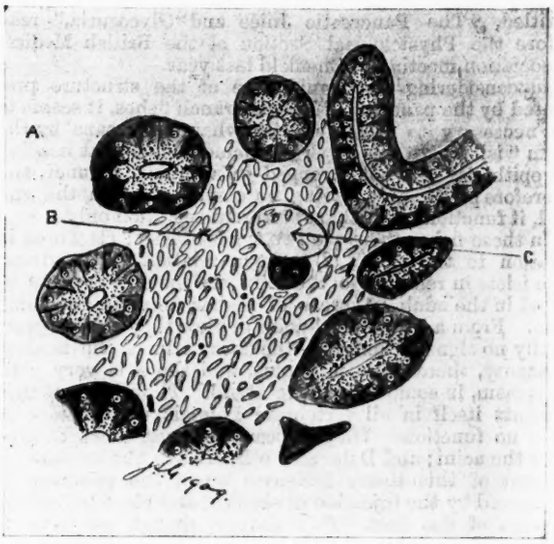


Fig. 2.—Pancreas of *Rhina squatina*. A, Zymogenous tubule; B, islet tissue; C, zymogenous tissue in islet.

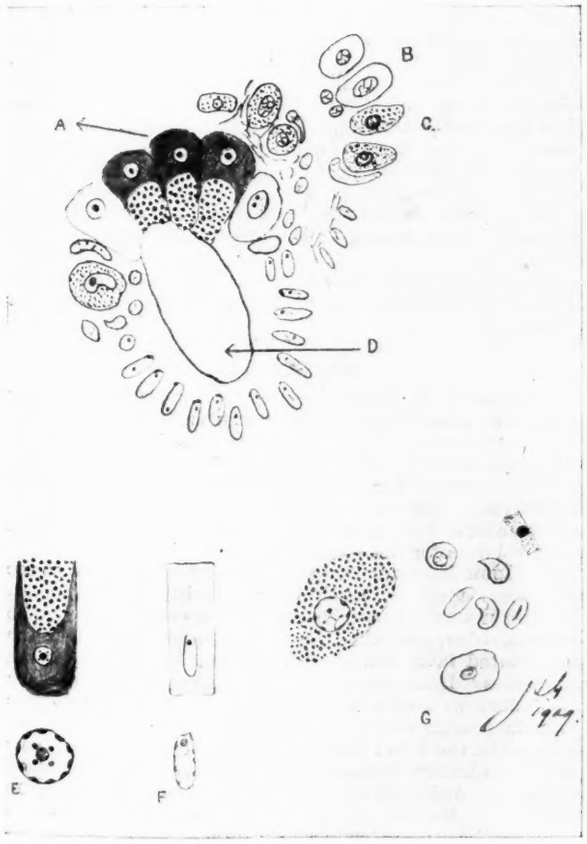


Fig. 3.—A, Zymogenous cells in duct wall; B, non-staining cells; C, eosinophile cells; D, duct; E, zymogenous cell and nucleus; F, duct cell and nucleus; G, islet cells.

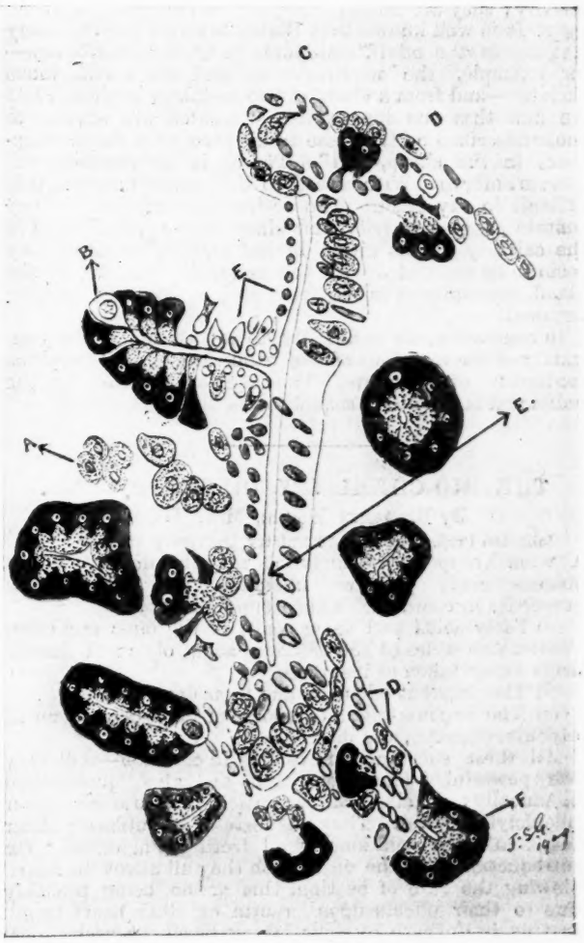


Fig. 4.—*Mustelus*. Showing islet formation and continuity of structure. A, Eosinophile cells; B, non-staining cell; C, islet formation; D, islet cells; E, duct; F, zymogenous tissue.

logical evidence in favour of such a view, and the influence it may have on the treatment of diabetes, in a paper entitled, "The Pancreatic Juice and Glycosuria," read before the Physiological Section of the British Medical Association meeting at Sheffield last year.

In considering the significance of the structure presented by the pancreas of Elasmobranch fishes, it seems to be necessary to define exactly what one means by the term "islet." In this paper we include under that heading all epithelial cells not arranged in a tubular manner, and therefore presumably having no connexion with the gut, and, if functional, capable of internal secretion only.

In these fishes there are two types of islet: (1) Those in relation to the acini; (2) those in relation to the ducts. The islets in relation to the acini are the only type to be found in the adult pancreas of higher animals, including man. From a histological point of view they exhibit practically no signs of activity—the chromatin of the nucleus is scanty, there is no nucleolus, and there is very little cytoplasm, in some cases none at all. The islet as it thus presents itself in all vertebrate animals we consider to have no function. They appear, however, to be derived from the acini; and Dale and others have shown that the amount of this tissue increases when the pancreas is exhausted by the injection of secretin and bleeding, and by ligature of the duct. This change, though we have no direct evidence, may be the histological basis of the internal secretion of the pancreas which controls carbohydrate metabolism. At the same time, it is important to bear in mind that the acini might have an internal secretion without undergoing such a change. There is no very definite basement membrane, and the relationship to the blood stream is more intimate than in other glands of this type.

The Islets in relation to the Ducts.

These islets, unlike the former, as also the ducts with which they are associated, show signs of functional activity; they are chiefly, however, of embryological interest. It is well known that Elasmobranchs present many features in the adult, embryonic in higher vertebrates—for example, the nephrostomes and the cartilaginous skeleton—and from a study of the histology of these islets we find that the appearances presented are similar to those described by Laguesse in his account of the development in the sheep, and of Pearce in his paper on the human embryo. With regard to their exact function, it is difficult to say much. The eosinophile cells which they contain suggest activity, and since they are not found in the salivary glands either in the embryo or adult, they seem to be associated with the metabolic function of the gland, especially as in the fetus this is the only activity required.

In conclusion, we would like to lay stress on the continuity of the functions of the pancreas suggested by the continuity of structure. The use of dextrose by the individual is the direct sequel to the digestion of food.

THE BIO-CHEMISTRY OF HAEMOLYSIS.

By BENJAMIN MOORE, M.A., D.Sc.,

Johnston Professor of Bio-Chemistry, University of Liverpool.

A WIDE group of haemolytics may be defined which possess many physical, chemical, and physiological properties in common. This group includes:

(*a*) Fatty acids and their soaps of the oleic and other unsaturated series of the aliphatic acids, oleic and linoleic acids being taken as instances.

(*b*) The different bile salts and their derivatives.

(*c*) The saponin-digitalin group of glucosides, such as saponin, digitalin, and mowrin.

All these substances have this in common—that they are powerful haemolytics, and are also unsaturated chemically; on chemical saturation they lose also their haemolytic power. They all possess an intensely bitter taste, and the solutions of all froth on agitation. On introduction into the circulation they all affect the heart, slowing the rate of beating, this action being probably due to their effects upon cruorin or other heart lipoid, just as in the case of their laking blood corpuscles. All members of the class are colloidal in aqueous solution, and the presence of one influences the solubility of another. All the members possess the power of conjugating with other different members of the group, or with glycerine, glucose, amido-acids, tox-albumins, etc., to form more complex molecules. All the members, in addition to more definite combination, possess in marked degree the property of forming unstable labile unions, which are easily dissociated again, with one another and with other organic bodies.

The haemolytic properties of the group as a whole depend on these physico-chemical properties. For blood corpuscles contain lecithin (that is, lecithides) and other lipoids, and these are rendered more soluble in saline or in serum by the haemolytics which act as solvents for them, and so bring about haemolysis. In support of this view, it is shown that sodium oleate, lecithin, and bile salts mutually increase one another's solubility when they are present in common solution. Sodium oleate similarly increases the solubility of sodium palmitate and sodium stearate, which, alone, are practically insoluble. The soaps of saturated fatty acids possess no such action, and therefore are not haemolytics. Similar actions of combination of lipoids or antigens with other lipoids of dissimilar constitution explain the balancing of haemolytics and to the shielding of corpuscles from attack. If there are two haemolytics, A and B, in common solution, either of which would attack and lake corpuscles also present in the solution, then, if A and B can combine with each other, they may mutually neutralize each other, and there may be no laking; on the other hand, if A and B are similar bodies and cannot combine, they will reinforce each other in attacking and combining with the lipoids of the corpuscles, and there will be almost instant laking of the blood.

An example of the former condition is a specially salivated serum, or a naturally active serum, such as pig's serum for sheep's red blood corpuscles, balanced and rendered inert by sodium oleate or sodium linoleate, or a lipoid of a syphilitic liver binding the complement of an active serum, so that later no haemolysis occurs in presence of the red blood corpuscle, because the place for lipoid is occupied, and the red blood corpuscle lipoid, therefore, cannot be attacked.

An instance of the reinforcing action in the case of two similar lipoids which cannot therefore bind each other is seen by taking amounts of sodium oleate and sodium linoleate which just can lake sheep's red blood corpuscle, in several hours, and allowing them to act in common solution at an equal concentration, when laking takes place practically instantly. The protective action of serum proteins against certain haemolytic agents, such as the soaps of the unsaturated fatty acids, is also due to labile combinations between protein and soaps, so preserving to a considerable extent the lecithides of the red blood corpuscles from attack and solution with accompanying haemolysis.

It is also shown that certain oxidizing agents in presence of traces of alkali cause haemolysis, while reducing agents prohibit it.

DISCUSSION.

Professor T. H. MILROY (Belfast) drew attention to the interesting points brought out by Kyes and Sachs in their well-known work, namely, that lecithin, when acting as the complement in snake venom haemolysis, set free fatty acid, and that cholesterin acted as an inhibiting agent on haemolysis. The work done by Professor Moore and his collaborators was of extreme value in providing exact chemical data for the study of haemolysis.

Dr. HUGH MACLEAN (Liverpool) asked with regard to the activating effect of lecithin on certain snake venoms, whether it was not possible that the venom acted on the lecithin, liberating the fatty acids, and that then the unsaturated fatty acids were set free to act on the red corpuscles. If so, the activating effect of lecithin on such substances as snake venom would be brought into line with the comparatively simple action of the unsaturated fatty acids, the latter causing haemolysis in virtue of their power of directly dissolving the lecithin of the red blood corpuscle. Again, in the case of a substance in which the addition of lecithin inhibited the haemolytic effect, it might be that the haemolytic substance became saturated with the added lecithin, and being unable to dissolve any of the corpuscle, lecithin was unable to cause any haemolytic action.

SOME NOTES ON THE DEVELOPMENT OF THE HEART.

By PETER THOMPSON, M.D.,
Professor of Anatomy, King's College, London.

A DEMONSTRATION was given from models, reconstructed in wax, illustrating three stages in the form of the human heart during the first month of development; the three embryos from which the reconstructions were made were 2.5 mm., 3 mm., and 7 mm. in length respectively. It was, however, clearly apparent that the heart of the 3 mm. embryo exhibited a stage earlier in development than that in the embryo whose length was 2.5 mm. The special points brought out in the course of the demonstration were:

1. That the form of the heart of a human embryo 2.15 mm. in length, figured by His, was confirmed by the model from the embryo 3 mm. The stage was very early—namely, that in which the heart tube had two physically fixed points, one at the venous end and the other at the arterial end. Between these points the tube presented two thin-walled dilatations—the future auricles—and a thicker walled U-shaped ventricular loop. In the 3 mm. specimen shown the tube was rotated slightly on its long axis, so that both auricles were on the right side of the body. The cephalic end of the ventricular loop was also rotated to the right.

2. That from a comparison of the three models it appeared that the U-shaped ventricular loop exhibited a very remarkable arrangement during the first month. As is well known, it was first of all placed ventrally and to the right. Then, as illustrated by the 2.5 mm. specimen, nearly the whole of it was on the right side of the body, the future left ventricle included, and the future apex of the heart was not the point in contact with the ventral mesentery, as might have been expected, but was represented by that part of the tube which was directed farthest to the right. The next change in position which the loop assumed was a return to the middle line, the apex coming down from the right and taking up a position in relation to the septum transversum. This was shown by the heart of the 7 mm. embryo, whilst that of Ingall's (4.9 mm.) showed an interesting half-way stage. Three possible reasons were suggested to account for the "packing" of the ventricular loop into the right side of the pericardial cavity, instead of the left—the asymmetry of the vessels; the spiral twist of the embryo, which, however, was not always to the right; and the position of the vitelline duct, which prevented extension of the tube in a caudal direction. The influence of expanding neighbouring organs had also to be considered.

3. That the absorption of the right horn of the sinus venosus into the right auricle was preceded by a kind of intussusception of sinus into auricle, the right and left venous valves being thus formed. These valves were continuous with one another above and below, and, further, the united portions were continuous inferiorly with the endocardial cushions of the auriculo-ventricular aperture. The transverse portion of the sinus, representing the coronary sinus of the adult, opened, in the 7 mm. specimen, into the ductus venosus aurantii.

4. The auricular septum (septum primum of Born) exhibited two apertures in the 7 mm. specimen—the ostium primum and the ostium secundum (the future foramen ovale). There was no indication of a septum secundum.

5. The bulbus cordis was indicated externally in the 2.5 mm. and 3 mm. specimens, but in the 7 mm. specimen it could not be recognized as a separate chamber either externally or from histological examination. There was a common structure both for the bulbus cordis and the aortic stem, and, so far, there was nothing to indicate the level at which the semilunar valves would ultimately be found.

DISCUSSION.

Mr. N. C. RUTHERFORD (Edinburgh) referred to Professor Thompson's view as to the "packing" of viscera and its influence on the heart during development as a possible mechanical result of the spiral rotation of the embryo to the right. He referred to the fact that the direction of this rotation is by no means constant, embryos with rotation to the left being a frequent occurrence, as Keibel's *Normentafeln* show. He referred to the Teleostean heart, and its similar, though less marked, turn to the right in its ventricular portion, and mentioned that he had always attributed this to the correlated development of other neighbouring organs. He asked, Was there in these circumstances a phylogenetic factor to be interpreted in this stage of heart growth? He at the same time deprecated any fanaticism on the subject of such phylogenetic factors.

NOTES ON THE DISTRIBUTION OF THE INTERCOSTAL NERVES.

By H. M. JOHNSTON, M.B.,
Chief Demonstrator of Anatomy, Trinity College, Dublin.

THE relationships existing between the nerves which traverse the parietes of the large serous sacs—the pleurae and the peritoneum—and the tissues to which they or their branches are distributed seem to merit a closer study by the dissector. My attention was specially directed to these nerves after thinking what an interesting chart would be obtained if it were possible to mark out upon the parietal serous wall of the pleural and peritoneal sacs, areas which would show by their position and dimensions how the serous or subserous layer was enervated by the nerves in question.

Before starting upon such an extensive piece of work, it seemed desirable to make a series of preliminary dissections, and accordingly, during the last three months, on the material that was available for the purpose in the Anatomical Department, Trinity College, Dublin, I have studied carefully the thoracic course of the intercostal nerves, and some notes taken during the time while engaged in this work form the substance of this communication.

The intercostal nerves are situated in the muscular layer in almost the whole of their course, and the branches which pass from them to the muscular fibres, though numerous and of small size, are almost as easily demonstrated as those which succeed in reaching the superficial fascia and skin as the lateral and anterior cutaneous nerves. Concerning the branches which pass into and supply the inner layer, little is known beyond the fact that their existence has been proved within the last few years, though their presence has long been suspected by clinicians. Ramström by histological methods has demonstrated that the subperitoneal fatty tissue both in the human subject and in other mammals contains many nerves which were shown to arise from the branches which pass to the muscles of the abdominal wall. It seemed, therefore, not unreasonable to assume that similar nerves are present ramifying in the connective tissue upon which the costal portion of the pleura rests, derived either directly from the intercostal nerves or from their branches to the intercostal muscles.

My first attempts to find these nerves were not attended with much success. Dissections of the intercostal nerves were made from the outside in the following way: After the upper extremities and all the tissues situated superficially to the skeletal framework of the thorax had been removed, the ribs from above downwards were carefully resected, leaving intact the intercostal muscles and the periosteum which was attached to the deep aspect of the ribs. The intercostal nerves and their muscular branches were next carefully followed out, but it was found impossible to show beyond question any twig which passed to and ended in the pleura, though some nerves were seen springing from the upper and lower borders of the intercostal nerves which do not appear to be muscular branches, but they were always broken when an endeavour was made to follow them out.

Although these dissections with reference to the main issue were most disappointing, they showed well the general plan of branching assumed by the nerves as they traverse the intercostal spaces. Each nerve, as it lies in the vertebral extremity of an intercostal space, has the appearance of a flattened band with superior and inferior edges, composed of bundles of nerve fibres (corresponding to the main branches of the nerve), lying side by side and joined together by connective tissue. From the outer and inner surfaces of the band no branches were found arising

from the upper border; only a few fine filaments were discovered, whose destination could not in all cases be precisely determined, but from the lower border a continuous series of branches were seen to proceed. Those proximally situated are short and numerous; directed downwards they end in the external intercostal muscle; next, a series directed more obliquely, destined mainly for the internal and subcostal muscles. Many of these are long and slender filaments, and are sometimes seen to terminate in a rather remarkable way, which will be referred to later on. Next, the lateral cutaneous branch becomes more distinctly separated off from the main trunk, but lies alongside the latter for a considerable distance before it pierces the overlying muscles to become cutaneous. The remainder of the intercostal nerve passes on in two or more branches, to be distributed to the muscles of the body wall and to supply the anterior cutaneous branches to the skin.

Some dissections were made to study the position on and the manner of distribution to the mediastinal pleura of those branches of the phrenic nerve which are described as passing to that structure, in the hope that the knowledge obtained in this way regarding the nerve supply of one portion of the serous sac would be of assistance in the endeavour to determine the nerve supply of another.

The following was the method of procedure:

The head was removed from the subject, and the vertebral column divided down the middle line from behind, and the sternum from the front. The two halves of the sternum were held apart and the pericardium was exposed. A vertical incision was made in the latter, taking care to avoid damaging the pleura. Through the opening in the pericardium the heart was removed, and the vertical incision was extended through the posterior mediastinum to meet the section through the vertebral column. Finally, the sagittal section of the thorax was completed, except that the diaphragm was left intact. In each of the two halves the pericardium was dissected off the pleura and phrenic nerve with the greatest care. There is no difficulty in doing this, except near the diaphragm, as generally there is a considerable quantity of fatty tissue between the membranes through which the phrenic nerve and its branches and blood vessels run. A dissection of the phrenic nerve, with its branches and communications, was then made, and the diagram will give some idea of their arrangement.

From the phrenic nerve, as it proceeds downwards in the thorax, quite a number of branches are given off. The upper ones are peculiar in being directed upwards as well as forwards. Those arising lower down proceed in a downward direction upon the mediastinal pleura. Supported by the connective tissue which surrounds them, they run a long distance, sometimes accompanied by blood vessels, but as often alone, and finally terminate in the finest filaments that I have ever traced. They appeared, however, to come to an end in the extra-pleural tissue rather than in the pleura itself. Of great interest are the communications between the phrenic and the sympathetic system. The subclavian loop (annulus of Vieussiens) is represented (on the right side) as giving off a branch which divides in a plexiform manner. Two main branches are given off, one of which communicates with the phrenic, another joins the internal mammary artery. Other filaments form quite a network—the subclavian plexus and numerous twigs can be followed quite easily to the mediastinal pleura above the level of the root of the lung; or perhaps it would be more correct to describe them as passing to Sibson's facial investment of the cervical pleura. On the left side a somewhat similar arrangement is found. I placed some of these fibres under the microscope. They were undoubtedly nerves, and by their behaviour with osmic acid there was evidence that a considerable proportion of them are medullated. They seemed to pass proximally through the inferior cervical ganglion to the rami communicantes of the seventh and eighth cervical nerves. This, if true, is an example of splanchnic afferent fibres reaching the posterior roots through grey instead of white rami communicantes. A good many filaments were seen passing from the first thoracic ganglion to the pleura in the vicinity, but I did not succeed in demonstrating any given off from the sympathetic lower down. A communication between the vagus and the sympathetic, which has been described before, was traced.

The following facts were made clear by these dissections:

1. That nerves to the pleura are exceedingly fine in calibre.

2. That they have a closer relation to the extra-pleural fascia than to the pleura itself, and appear to end by ramifying in that fascia.

3. That the mediastinal branches of the phrenic appear to make no communications with the phrenic.

In the next series of dissections the intercostal nerves were examined from the pleural aspect. The pleura was most carefully stripped off from the ribs and intercostal muscles, and special attention was devoted to communications and fine branches.

An account of some of these will now be given.

The intercostal nerves are linked together in two ways. First, by short branches, which pass from one to the other, close to the vertebral column. These are frequently found between the first and second, and are described in books; but often connexions are seen in other situations, especially between the fourth and fifth nerves. A considerable variation exists. They are nevertheless exceedingly important to bear in mind, especially when the distribution in the skin is taken into account.

The second type of communication is found in the lateral region of the thorax. It is an exceedingly common thing for one of the finer twigs which arise in this situation to traverse the subcostal muscle and pass to join the nerve trunk in the next space. Between the third and fourth and between the fourth and fifth nerves we find them often, but they can be demonstrated at times in other situations. These connecting nerves that were followed out ended in the internal intercostal muscles. I have been unable to discover any reason why such a muscle should be enervated by the intercostal nerve belonging to the space above.

Some rather remarkable branches of the intercostal nerves were noticed. At the lower part of the thorax fine filaments proceeded from adjacent nerve trunks, and formed together upon an intercostal artery, and in at least one instance reached the upper surface of the diaphragm. These nerves could be followed along the course of the artery into the abdominal wall. Other exceedingly fine branches could be demonstrated ramifying in the connective tissue between the ribs and pleura. These, when followed back, could be traced for a long distance through the fibres of the internal intercostal muscle before the point of origin from the main trunk or a branch was arrived at. Each intercostal nerve seems to give them off at irregular intervals to the connective tissue over the rib above the nerve and the rib below, and from their fineness it is not surprising that they have been hitherto unrecognized. They have been submitted to microscopic examination. Indeed, this precaution is quite necessary, for in no region of the body is it easier to manufacture nerves than this. It then appears that the branches of the intercostal nerves which account for the sensibility of the pleura are to be found ramifying in the extra-pleural connective tissue, and not directly connected with the pleura itself.

SOME FEATURES THAT MAKE FOR PERSISTENCE.

By Professor R. J. ANDERSON, M.A., M.D.,
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BIOLOGICAL units and composite protoplasmic structures are often remarkable in showing, not merely a response to a direct stimulus, but also in showing an attempt to resist a pressure, or tension, or straining force by bringing an opposing force to bear. This is so conspicuous occasionally that in some climbing plants the stem moves as if seeking a hard object against which, or by means of which, its energy may be used in the right direction. "Spontaneous movements are produced by autogenic utilization of external factors for directive purposes."

Corals give evidence of the power of resistance which comparatively simple animals may have. The external case or theca of a madrepore coral represents the surface of resistance where the surface pressure comes into operation, and where the protoplasm receives special instalments of energy. The deposit of lime diminishes the immediate effects of pressure from without, and promotes for the time the persistency of the units and the importance of the colony. Soon, however, the deposit

increases and shuts out direct pressure, although vibrations may reach the diminishing protoplasm for a longer time.

Septa reach from the theca inwards in the direction of the radii. These vertical walls do not occupy the position of the mesenteries; they are not simple calcifications of the mesenteries. They form strengthening walls at angles of 60 deg. as between two. A mathematical explanation can be given of this which brings with it the only plausible hypothesis. Soft cylindrical masses tend to assume hexagonal forms under equal lateral pressures, as in honeycombs. The pressure of six cylinders upon one means the division of the diffuse pressure of an external medium into six. Some corals resist this by working along six radii. If the external walls were very hard this pressure could not arise with the same effects. Secondary septa arise between the first of these from without, and the dissepiments running from septum to septum can be explained as differences in internal local pressures or strains. The columella in the centre and the septa running out from this may be evoked by internal pressures partly coincident with external operations. The rods running between septa and tabulae may be of the same nature.

It is evident that beyond a certain phase the deposit of lime tends towards destruction. The coral will, or ought to have, transferred its life and energy to new buds before finishing this page of its history. One may instance examples among the sponges, where the silicious deposits sometimes encase the canals. The power of resistance evoked by pressure is thus illustrated.

The presence of skeleton-forming cells or units has been proved for many animals, and protecting cells, so-called, are discoverable in almost all metazoa.

The anterior extremities are turned to dextrous purposes in many mammals. They are used for seizing, grasping, climbing, swimming (turning, rising, or balancing) in water, and running, walking, jumping, steering, flying, and burrowing.

One can form an estimate of the importance of the digits best by referring to the varieties and embryological results. Varieties may be anomalies or atavistic reminiscences. Or one may take account of the chief forms in which the hand presents itself in vertebrates.

Ichthyosaurs have been found with ten fingers, due possibly to the hardening and segmentation of the calcified lateral margins of the broadened flipper (epiblast and mesoblast). The increased size of the flipper might prove advantageous. In cetaceans an increased number of phalanges is often found (sometimes in fetal life the number is greater than in the adult) (Kükenthal). In fetal horses the number is at one time greater than in the adult horse. The splints are in fetal life joined to the buttons (Cossar Ewart).

Collections of equine limbs in America have shown that many horses retain evidence of having come from polydactyl ancestors. Professor Krause figures (*in skelet der oberen und Unteren extremität*) the limb of an 11-mm. embryo with the foundation for seven digits laid; the separate fingers are better seen in his note in the *Anatomischer Anzeiger* for July, 1909. The photomicrograph of the original specimen shows five little elevations corresponding to the fingers. The foundations showing in the transparency are real mesodermic foundations, and not ectodermic as in certain sauria. Seven fingers are rare and apt to be attended with other irregularities. A broad hand with seven fingers had a wrist with ten bones, and a forearm with two ulnae, but no radius (Dwight quoted by Krause). The little nailed pedicles one sometimes finds at the inner side of the hand or little finger may be the postminimus. They are not always connected with the pisiform. These structures are sometimes, if not always, due to hereditary transmission. Schenk figures a nine-rayed section of an embryo in which the divisions do not appear outside. The nine arrangement is due to a distal splitting of the two middle (Krause in op. cit.).

The postminimus seems to be commoner than the praepollex. The pisiform was the basis of a cartilaginous ray of which an accessory cartilage was the extant distal end, whilst the middle part had disappeared (Lebouco on *Vespertilio maximus*. V. Bardeleben found a praepollex and praehallux in fossil Chelonia. Pflizner and Philenius have also described the cranial extremity as polyactinic. It seems most correct to regard the seven-rayed condition as the normal one. The pisiform and radial sesamoid appear to represent the basal parts of the praepollex and postminimus. Commencing with aquatic animals, the number and flexibility of the rays within certain limits favours precision of movement. There is greater danger with increase in size, and the structures may become unwieldy, unless they are collapsible. It is still more important for aërial animals to have organs that are easily folded up. The reduction in the number of dactyls opened out new possibilities to animals living on land. The reduction of the digits enabled the horse to move quicker than his many-fingered ancestor. With this complete or partial suppression of certain parts, "there has been an access of development of some parts in relation to others," and "certain parts that were originally distinct have coalesced." Reduction has taken place in many ungulates to a less extent than in the horse. This and other modifications has favoured this power of movement of these groups, and favoured their survival. Sloths have a reduced number of toes. The reduction seems to favour an arboreal life where the animal lives by clinging with the aid of the claws; bats hold themselves up in this way also. There is a deposit of lime in unusual places in sloths, and the ordinary toes are provided with strong claws. Pristine men provided with more fingers and toes would be well fitted for movement in water or on soft ground. Arboreal men have special peculiarities of limb. Mountaineers acquire peculiarities, and some of the early races have characters that suggest a mountain life. History—even recent history—tells us of men who were well fitted for long marches. Certain human groups move on the "heel and toe" alternately, which brings into operation many bones with their muscles. The plantigrade groups present structural peculiarities of their own. The separation of the anterior surface of the astragalus from the tibial surface is good for climbing. An astragaloscaphoid bone was present in each ankle of a neat small-footed man brought to the laboratory once. I had no history of him. Professor Krause believes that the union of the astragalus and scaphoid corresponds to the scapholunar of carnivora.

The arrangement of the trabeculae in the head and great trochanter of the femur may be cited as an example of localized skill in producing biologically a perfect arch.

The mandible may be taken to illustrate the effects of conjoint efforts in manufacturing an apparatus used in various ways. The mandible is used not only for seizing, holding, masticating, and preparing food, but for dextrous operations such as carrying, fetching, burrowing, burying, grasping, and climbing, as a weapon of offence and defence; in respiration (?) and speech (in man). Its form and size answer to the functions and its relations. The bone becomes incidentally a protecting and supporting bar of the greatest importance. Cartilaginous elements in mammals represent sometimes the separate elements of sauropsids (Stieda quoted by Helprin). Aberrant ossicles arise sometimes. Nature, beyond the dividing of the ways, may use up foundation structures in building up new organs. A reference to the relations of the angular articular and coronary in sauropsids is only necessary to remind us that these bones appear to be interpolated between muscle bands. One must try to think of the bones and muscles as forming parts of the complete apparatus, as well as of their individual forms and functions. The separation of the skeletal from the active elements is emphasized by the formation of strengthening tracts of close bony deposits. It is the osteoblasts that produce by proliferation new bone from a transplanted spicule (MacEwen). The shape of the lower jaw is obviously due in part to the shape and relations of the adjacent parts. The spout-like character of the lower jaw in Megatherium and Elephas is assumed in conformity with the shape of the structures that lie in contact with it. One speaks of constant pressure producing atrophy. The shape of the jaw in the above animals is best explained, perhaps, by saying that an effort is made to mould the mandible on the structures which rest in contact with it. Grooves and notches that result, or seem to result, from the pressure of teeth may be, in some cases, explained in the same way. The maxilla and mandible may be subject to the same forces so that both may bend down, or the maxilla alone may bend down; and

the mandible may abut on the postero-inferior part of the lip of the rostrum (Rhynchosaurus), and display thus an effort to resist the maxillary encroachment. Processes of bone, due no doubt to efforts of resistance, may become useful shields for vessels and nerves, although they may not be primarily due to these. The large ramal angle of mycetes and the inflected angles of marsupials act as shields. The posterior border of the ramus reaches the posterior eighth of the skull in *Elaphodes michianus* (China). The coronoid is short and pointed in tragulinus. The angle is thin, hollowed, and projecting in cricetus. In the camel, hippopotamus, and *Sus salvanius* the posterior border of the ramus is only a little in front of the posterior surface of the skull (end). The Ursidae, as a somewhat aberrant group, show some points of interest. The posterior border of the ramus in *Ursus polaris* is thick, but the bone is thin in front of this. In *U. malayensis* the border of the angle is thick, the angular process is notched below and grooved above. The angle in *Ursus polaris*, young specimen, is slightly inverted. There is a ridge between the coronoid and angular hollows. *U. thibetanus* has an inflected angle. The ascending ramus is bent posteriorly in otaria. The angle is slightly everted in a specimen of *U. arctos* and prolonged. *Ursus labiatus* has the coronoid process thick in front. The ascending ramus is hollow and translucent. Owen calls attention to the reptilian characters of *Canis australis*. Otocyon has an inflected angle. It may be well to note here the large masseters and temporals, but small pterygoids of carnivora, compared with the small temporals of herbivora, the very small temporals of rodentia, and the large temporals of omnivora and frugivora. The muscles that reach to the side of the skull and jaw are responsible for the thinning of the skull bones in certain positions and for the formation of the thick ridges and crests. The increase in size of the brain has been attended with a reduction in the size of the jaw and its musculature, and a diminution in number and size of the teeth. The transference of some mandibular functions to the hands and important changes in habits have been associated in some cases with these changes. M. Pelletier emphasizes the fact that an organ which is modified as the function changes may be said to modify itself. Speaking generally, the function of the mandible is movement (Helprin). The teeth, perhaps, give the physiological impulse to the jaw to elongate in some cases. Elongation of the head appears to be due to elongation of the jaws. The one is associated with the others. In cetacea, however, if I may suggest, the elongation of the rostrum and mandible enables *Mesoplodon* and others to be more expert in foraging, so that Cuvier intended, it seems, to associate the sense organs with the foraging. The size of the jaws has much to say to the size of the head, and, speaking directly, the one statement involves the other (Le Double). The bone deposit is arranged along definite lines (trajectoria) in man. There are seven chief lines of deposit: The dental, basilar, posterior, marginal, princeps, copular, and radiate. They represent the resistance offered to strain, stress, or pressure of an interrupted kind. The development of the carnivora shows a change in the shape of the skull bones as the muscles grow into the adult form. So it seems that man's early ancestor "renounced his horizontal position" and his arboreal habits; "the muscles of the neck became little by little atrophied." The encephalon became larger, the back part of the head (the cranium) became inflated, the masticating apparatus reduced, the jaws abbreviated, and the head became poised on the summit of a vertical column.

SOME RESULTS OF UNIFORMITY OF ACTION AND HABIT.

By Professor R. J. ANDERSON, M.D., M.R.C.S.,
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THE following principles are important in studying living organisms: (1) The principle of least space, (2) that of least power, (3) that of least expenditure, (4) that of least waste, (5) that of least stimulus, (6) the principle of Nature's forces, (7) that of resistance.

There are amongst external forces those that are spoken of as mechanical, chemical, and physical. Some of Nature's forces are rhythmic, some seem erratic or irregular.

It may be well to keep in mind that organisms and organs are often independent, and, under favourable circumstances, may increase their productive capacities. The doctrine of inheritance all recognize. Many animals and plants and the organs and tissues change in the course of development from the elementary to the more complex. The influence of vapours and exhalations are known to act as stimulants, seductive or repellent. The importance of these is often emphasized by the care with which organs are built to secure a requisite supply of oxygen, or heat and light, or proper nutriment, including water.

The effects of many forces in Nature are hard to estimate. It is absolutely true that all organisms on the earth's surface (more so near the Equator) are being hurried through space at a terrific rate, and that the rate is less considerable at midday than at midnight. The sun and moon, and, in a less degree, planetary influences, affect the earth and the beings upon it; although the prophecies of the astrologers miscarry too often to gain attention from those who demand precision in act and thought. The value of sunspots as controllers of human interests has had more than a nominal fall.

Experience seems to have shown that in the matter of Nature's forces it is often "neck or nothing" with organized beings. Changes in organized beings have been explained as the result of environment (including food), and as the result of inheritance. The favourite and generally accepted view is that selection has helped to emphasize characteristics that make for viability. The opinion that accidental irregularities are not easily propagated seems to predominate. The more artificial the defect, the less chance of inheritance. It is easier to study the effects of physiological training in the lower animals in relation to inheritance than in man, since imitation plays an important part in the human race. It is admitted, however, that in animals factors assert themselves in developmental studies so efficiently and so often that one cannot be sure of the results. Many, perhaps most, of the prevailing forces are little known, and can only be learnt through the repetition of these by some easily influenced receptive organism.

Enough has been said about the foundations that are laid for organs or structural fabrics that have never been completed. These foundations mostly disappear when not used, and the part disappearing may prove of value in promoting the growth of some other part. The complete structure or organ is built sometimes of the early foundation, so that an organ when completed may show some ancestral traits. Change in nutrition is given as the cause, the efficient cause, of the abnormal (or normal) condition. The explanation is not so easily understood as it seems. Darwin himself and his followers seem to have foreseen the difficulties and disappointments in inquiries where possibilities of the living structure were not understood. Certain chemical substances promote the growth of certain structures (note the effects of iron, phosphorus, potash, etc, upon certain plant activities). This serves to show us how much animals and plants can do that we do not know.

M. Desfosses has called the attention of the medical world to the investigations of M. Cuenot. There are many examples of animals and plants living apparently as a well-marked species under uniform conditions of movement and habits, changing sometimes quickly and producing another and different species, on the environment being changed, and sometimes without any apparent change in the environment. This is susceptible of an explanation which meets with some acceptance, namely, that tissues with latent energy, a long time kept in abeyance, may spring into activity under the influence of new stimuli and new food.

The mollusc, *Dreissenia polymorpha*, has been carried from the Caspian and Black Seas to distant waters, and has shown a keen appreciation of the river and pipe water being brought to its gills; it holds to fixed supports by its well-developed byssus, whilst it gains abundant oxygen and food from the water ever renewed. This mollusc fills what may be called one of the vacuous places in Nature. Does not Nature, as the above scientist observes, abhor a vacuum? The blind fish of the Kentucky Cave can get along without eyes. Ray Lankester suggests that the valuable eye material may be used to build up sensitive organs that are more useful in dark places.

A small Californian blind fish lives in rock chinks and other dark places on the shores below tide marks. This fish can see when young, and is able to forage with advantage later without eyes. Other examplles are cited. One which may be referred to, *Lecanium cornei*, attacked the *Robinia pseudacacia* after its introduction to Europe. The effect on *Lecanium* is of interest; specimens of the *Robinia* insects were sent by Professor Horvath to Douglas, who considered the *Lecanium* as a new species. It seems possible that the lucifugal fish possessed power to accomodate itself to its new surroundings. We have examples of delays in development owing to surroundings. One admits in these cases the powers to change. Many modifications that seem to place an animal in harmony with its surroundings are more easily explained by reference to selection, whilst other views have been difficult to support by sufficiently clear examples. Nerve exigencies in man have been made responsible for the shortcomings of various organs internally and externally. New demands have led to the withdrawal of nutrient material, even the proteids of specialized tissue. It is well known, on the other hand, that limbs and their complex tissues are reproduced after destruction in many groups of lower animals. The tissue at the proximal end of an amputated limb acts like a conscious organism in sending out tissue to make a new limb for the crustacean. Small branches of laurel under the influence of heat, moisture, and darkness, throw out rootlets. The decentralization of the nervous system in invertebrates accounts for this difference. There are many who think that one should not regard the mind as central. It has been urged by some psychologists that sufficient evidence is existing to warrant the assertion that the mind reaches even to the finger tips. The examples adduced seem to show that animals, when placed in difficulties, are sometimes called upon to use tissues to do unaccustomed duties. The increased sensitivity and capacity, aided by the acquirement of new highly-specialized tissue, results in new methods of food supply in a medium that has few attractions. Every one knows that it is impossible to alter the tissues of highly-organized mammalians without running a risk of destroying the animal; so evidence of the possibility of such a consummation—conscious effort and appropriative powers notwithstanding—is very scanty. The effects of training through the sense organs, whether initiated by man or not, tends obviously to uniformity of action—for example, the building of birds' nests, the rhythmic performance of certain work. There seems in animals to be a subconscious response to stimuli. This takes the form of an imperfect reproduction of a previously acquired act. Witness the effect of walking through a street in which many harness horses are awaiting their owners. If the pedestrian wear a silk hat and have a measured (equine) tread, some horses lay back their ears, others prick and point them, and a third set raise their heads as if in ready acknowledgement of a coming master. The recognition of the sound and form, which are indistinctly equine, is probably subconscious and imperfect. High training tends to uniformity and increases the degree of automatism in horses. The movement of a body of cavalry 90,000 strong was witnessed by a correspondent some years ago in Russia; the movements of the horses took place simultaneously. The instance given by Professor Lloyd Morgan, of the cow and her calf's skin stuffed with hay, tends to prove the subconscious nature of some acts in some ruminants. Subconscious cerebration takes place apparently less frequently in carnivora. The fact that a whispered word will cause a horse to act in a desired way proves good training, but the response seems subconscious only, akin to the act of a somnolent man. Uniformity of action may be established by: (1) Restraint due to competition; (2) methods of obtaining food; (3) care of offspring; (4) herding; (5) storing. Animals trained by man are affected by the nature of the restraint and force, and the mode of administration of food, as well as general treatment.

Command and simpler forms of suggestion are the chief means of evoking a response through the proper channels. Uniformity of habit in thought and act is established in the case of man by imitation, copying, and other methods.

Training at home or school is now generally admitted to be necessary. School is considered absolutely necessary at both ends of the social scale: "Take *a* from aebody, pay naebody, and send the child to school."

Systematic thought and the value of coherent thought and action, socially and individually, are inculcated. It is well known that the training of the pickpocket may become, by example, as efficient as the training of a lawyer, and the training of a steeple-jack may be as precise as that of the politician of a free State where "government" aspires rather to be popular than just. Casual training is inevitable. Does not "the swelling or fitful gusts of the westerly gales, or the wailing of the wind as it blows across the moors, influence the Highland piper in his movement?" And the echo of rhythmic wildness of the ocean crag and mountain brings back, for a time, to the *status quo* the mind of the dweller in cities who languishes for the wild wandering ways and places of his primeval ancestry.

It is said that all movements are rhythmical, and social movements amongst others. It should not be difficult to satisfy most people that consecutive thought is a common and natural thing. Every day one can witness the same sequence of action at almost the same time in many houses. One may notice that the same rhythm mainly prevails for those who are engaged at the same work. So that independent collateral operations take place at the same time. Training tends to establish these whilst repetition maintains them. Rhythm becomes easily established in animals; the order of sequence in the matter of water and foods gets easily established. People of the same family, and less so of the same isolated hamlet, are apt to have collateral operations of the same kind in hand. Imitation tends to reproduce the thoughts, emotions, or acts that the imitated features, pose or words exemplified. So proximity is responsible for some, if not much, of our natural or aberrant thoughts and actions. It is impossible to compare the number of people thinking about the same thing with the number that strike out new lines for themselves. An attempt to do this would give the assurance that parallel or collateral lines of thought are what most communities labour to establish, so that one may appear to be reading the thoughts of others when they reveal their own thoughts.

The influence of animal on animal, as regarded even under the most elemental conditions, involves the observer of it in many difficulties; these increase in number and complexity in the higher groups. There is a possibility of ascertaining something by the study of animal movement through the intermediary of a sensitive observer.

ON THE CERVICAL PLEURA.

By J. S. Dickey, M.B,

Demonstrator of Anatomy, Queen's University, Belfast.

During last winter I dissected the cervical pleura in thirteen adults, with a view to determine its surface relationships to the clavicles and sterno-mastoids, etc., and also to take measurements of the thoracic inlet and the mean breadth of the sterno-mastoids from a topographical standpoint. Eight male and five female subjects were examined.

The methods employed were twofold:

(*a*) By the employment of a camera capable of taking life-size photographs; the superficial and deep parts were compared, and a composite tracing formed.

(*b*) By the use of measurements; a mean result was obtained separately for the eight male and for the five female subjects.

In the case of a man aged 62 all the measurements were practically identical with the mean results in the series of eight males, and the dissections are shown in the accompanying drawings (see p. 690). Fig. 1 represents a superficial dissection. The sterno-mastoid muscles are each about 6 cm. (2½ in.) in breadth, measured along the upper border of the clavicle. The total breadth from outer border to outer border was 13½ cm., or 5¼ in. The brachial plexus and subclavian artery are seen externally; the isthmus, etc., in the middle line. In Fig. 2 the sterno-mastoid muscles and the depressors of the hyoid bone are removed, but their position is traced in relation to the deeper structures. The important vessels seen are the subclavian and internal jugular veins; the subclavian, carotid, and innominate arteries; the brachial plexus, the scalene muscles, etc., are also shown. Fig. 3 represents the deepest dissection I made, exposing the cervical pleura by the removal of the large vessels and scalenus anticus.

A small part of the subclavian artery is removed from its groove on the anterior and inner aspects of the pleura. The vagus nerve and the annulus of Vieussens cross the first part of this artery in the position shown. The scalenus medius supports the pleura externally and behind. Here also is found the lower trunk of the brachial plexus. In a considerable number of cases the third part of the subclavian artery rested on the pleura, as well as on the upper surface of the first rib. This is a point noted usually by surgical writers, but not mentioned in anatomical descriptions as a rule. The groove for the innominate vein is shown on the pleura internally.

The question how the cervical pleura is supported against the intrathoracic pressure, is of importance in considering the apical invasion of tuberculosis; as, if the first costal

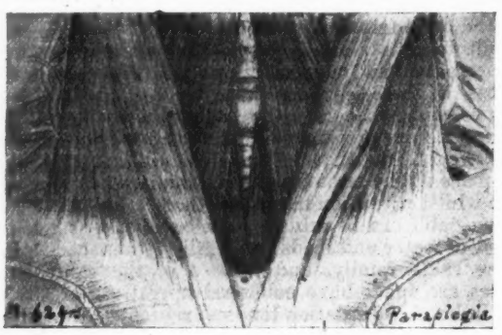

Fig. 1.

arch is raised and the cervical pleura is not raised in at least a corresponding degree, the aëration of the apex will be defective. English textbooks of anatomy give rather brief accounts of the supports of this important region. To quote Cunningham's textbook:

> The cervical pleura is strengthened and held in place by an aponeurotic expansion, first described by Sibson, which is spread over it, and is attached to the inner concave edge of the first costal arch. This fascia is derived from a small muscular slip which takes origin from the transverse process of the seventh cervical vertebra.

In other books this muscle is named the scalenus pleuralis, or scalenus minimus. It is no doubt often insignificant and may be absent. Professor Fawcett, in the

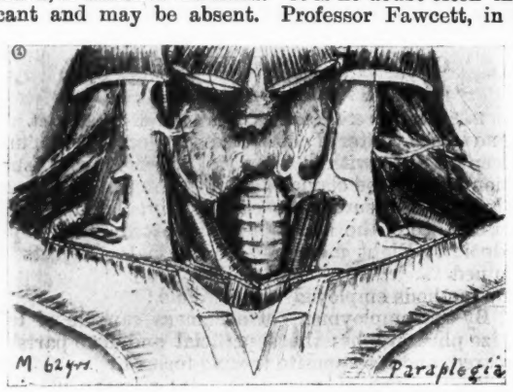

Fig. 2.

Journal of Anatomy and Physiology, vol. xxx, described two variations in its attachments, both of which I found in one case, though they seemed fibrous rather than muscular slips—namely, (1) its origin from the sixth, or sixth and seventh cervical transverse process; (2) an additional attachment of Sibson's fascia to the neck of the first rib between the eighth cervical and first thoracic nerves. I found the latter fibrous slip in several cases, and it moors the cervical pleura to the lower part of the neck of the first rib.

To the inner side of the scalenus pleuralis is the notch through which passes the superior intercostal artery. Internally to it, and occupying the notch almost completely, is the inferior cervical ganglion. Can the marked cerebral and adynamic features so frequently associated with *apical pneumonia* be accounted for by an acute toxic action spreading by direct continuity through the inflamed pleura to this ganglion or its vicinity? The annulus of Vieussens is also so close as to be equally affected by pleuritic inflammation or pressure, or by adhesions causing traction.

Another problem suggests itself. May the remarkably low vascular tension and cardiac acceleration in pulmonary phthisis be due to a local chronic mild irritation fatiguing the vaso-constrictors, or stimulating the accelerator fibres in this region? I may say that in one case, referred to by Bonney, on the healing of the lungs, the pulse, previously accelerated, fell to 40 and became irregular. Is it possible that fibrous adhesions may constrict the vagus?

Internally to the notch referred to the pleura is supported by several strong bands; one, specially strong and occurring frequently, passed upwards to the prevertebral fascia. Others which I also found passed to the

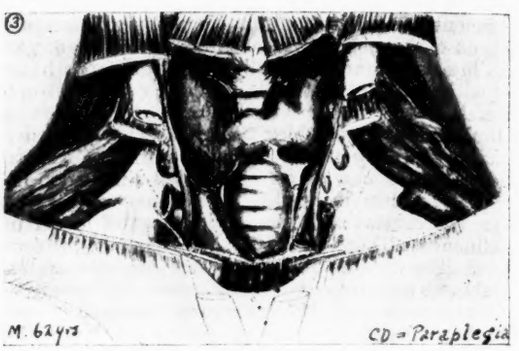

Fig. 3.

trachea and oesophagus and to the vascular sheaths of the subclavian arteries. These bands have, I believe, twofold importance:

1. They probably serve as routes along which the tubercle bacillus finds its way to the pleura and so to the apex of the lung from lymph glands in the neck, carious vertebrae, or the pharynx.

2. From a hygienic standpoint they will serve to aërate the apex when the neck is held well up, as they are then put on the stretch. I am afraid their use is neglected too much.

Fig. 4 represents a composite diagram from (1) and (3), and shows the relationship of the cervical pleura to the sterno-mastoids.

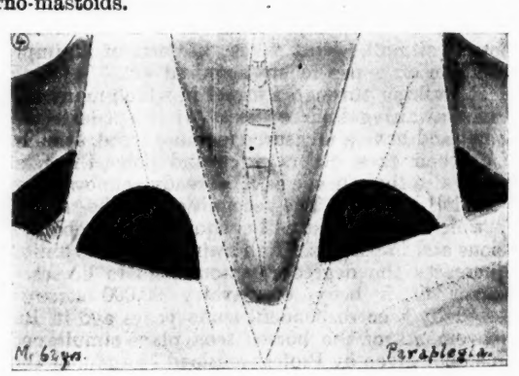

Fig. 4.

The average measurements obtained from the series of cases were as follows:

Mean breadth between the posterior borders of the sterno-mastoids at the clavicles:

Mean in 8 male subjects	...	13.32 cm. (5¼ in.)
Mean in 5 female ,,	...	10. 8 ,, (4¼ in.)

The width of the thoracic inlet marking outer limit of pleura in neck:

Mean in 8 male subjects	...	11. 2 cm. (4½ in.)
Mean in 5 female ,,	...	9. 6 ,, (3¾ in.)

With regard to the width of the thoracic inlet, in those men with apical tubercle or pleurisy it was above the average. In the man with the smallest (9.6 cm., or 3¾ in.) and the one with the greatest dimension (12.3 cm.) heart disease at an advanced age was the cause of death. The five female subjects were mainly tuberculous, and had as large a diameter as the man of 75 who died of heart disease.

Thus, no causal connexion is shown by this measurement in this series of thirteen cases.

Height of pleura 1 in. (roughly) above clavicle.
Depth of pleura behind anterior surface of clavicle at its upper border 1¼ to 1½ in. in males, 1¼ in. in females.
Breadth of outer borders of first costal arch 6 in. in males (15.6 cm.), 5¼ in. in females (13.3 cm.).

The lung projecting into the neck may be subdivided into an inner portion, or (*a*) *pleural portion* covered completely by the sterno-mastoids in front; and (*b*) an outer or *costal portion* reaching out underneath the first rib and brachial plexus to the anterior angle of the posterior triangle of the neck—that is, it projects in some cases beyond the outer border of the sterno-mastoids when these are less developed than usual, and provided that the costal arch is well raised above the level of the clavicle.

THE CHONDRO-CRANIUM OF THE TROUT WITH REFERENCE TO THE BRAIN AND CRANIAL NERVES.

By N. C. RUTHERFORD, F.R.C.S.,
Edinburgh.

[ABSTRACT.]

MR. N. C. RUTHERFORD demonstrated a wax model of the brain, cranial nerves, eye, labyrinth, and chondro-cranium of the brown trout in the stage of development which they have reached at the time of the hatching of this teleost.

The model had been constructed on the Born plate method at a magnification of one hundred times from a series of microscopic sections 10μ thick. It was unique in that it combined so many structures in the one model, as well as being the reproduction of a stage of the development of the trout not previously investigated. This stage was intermediate between the early ones investigated by Stöhr in 1882 and the *Stadium optimum* in the development of the chondro-cranium treated of by Gaupp in his excellent contribution to Hertwig's *Handbuch der Entwickelungslehre*.

Attention was drawn, first, to a narrow band of cartilage lying between the lateral aspect of the brain above and mesially and the eye below and laterally. The independence of this chondral element was remarked and emphasized, it being entirely unconnected with the rest of the primordial cranium. Further, its composite nature, embracing as it did part of the ethmoidal roof plate, the epiphysial band, and the supraorbital band, was clearly demonstrated.

A similarly situated cartilaginous element was found in other vertebrates from Selachians up to reptiles, and including amphibians and teleosts, as described by Sewertzoff in 1899. On the ground of the conditions described and of observations upon other stages in the teleost, and having regard to the variable nature of the element in other vertebrates, it seemed unjustifiable to attribute to it, as did Sewertzoff, a morphological significance equal to that of the parachordals and trabeculae. It was further sought to give a higher value to the ontogenetic factors in the development of the chondro-cranium in its relation to the brain and cranial nerves, and to deprecate the modern tendency to resort on any pretext to phylogeny for an explanation of the mode and sequence of cranial construction. Nature did not fit brains and sense organs to crania, but devised protective coverings adapted to the form and volume of brains and sense organs developing in all manner of specialized directions.

Attention was then directed to the basis capsulae periotic ae, and it was demonstrated that the primordial fenestra ovalis, as described by Parker and Stöhr, had at this stage become divided into a saccular fenestra and a fenestra lying oral to this last, and showing in its general relations even greater affinities with the fenestra ovalis of higher vertebrates than did the more primitive one characteristic of an earlier stage.

By reference to earlier stages in the development of the hyomandibular lying to the lateral aspect of this fenestra ovalis it was shown that the accepted idea of the growth forward of the cartilage during ontogeny to embrace the facial nerve was in the case of the trout erroneous. A down growth of no great size from the periotic capsule at the edge of the fenestra joined with the symplecticum in front of the facial nerve, and finally united with the primitive hyomandibular. It was remarked that this sequence of events showed a remarkable analogy with the mode of growth of the amphibian columella, and formed an interesting instance of parallelism in the evolution of the apparatus for sound conduction in the amphibian and of the suspensorial apparatus of the teleost, both being probably homologous to a certain extent with the ligamentous structure suspending the Selachian quadrate from the periotic capsule.

SECTION OF HYGIENE AND PUBLIC HEALTH.

LOUIS COLTMAN PARKES, M.D.Lond., President.

DISCUSSION ON DISCHARGE OF SEWAGE EFFLUENTS INTO TIDAL WATERS.

OPENING PAPERS.

I.—HENRY O'NEILL, M.D., M.CH.R.U.I.,
Consulting Surgeon, Royal Victoria Hospital, and Member of Belfast City Council.

THE problem of the collection, removal, and purification of sewage in Belfast was one of more than ordinary difficulty, owing to the large number of linen manufactories, mills, gas and chemical works, foundries, soap and candle manufactories, ropeworks, and distilleries in the city, and also the situation of the city on the River Lagan, being surrounded on the north and east by the sluggish waters of Belfast Lough. The River Lagan enters Belfast Lough, and has a course of about 45 miles and a drainage area of about 227 square miles, a considerable portion of which is elevated ground with large rainfall. The volume and velocity of the river are therefore considerable. It is a tidal river for about three miles above the Queen's Bridge, and the range of tide at Belfast quays is about 9 ft. at ordinary spring tides, and about 6½ ft. at ordinary neap tides. There is no great inequality in the duration of flood and ebb tide. The borough is divided into two portions by the river, the principal portion lying on the co. Antrim and the remainder lying on the co. Down sides. The present population of Belfast is estimated at over 386,000 people. The area is 16,504 statute acres—14,626 land, 1,878 water. Much of the city is low lying, being a few feet above high-water level; part of it is more elevated. The daily water supply is estimated at 15½ million gallons. The average rainfall for the last ten years is 37½ in. per year. This would equal an average daily rainfall of one tenth of an inch. This large amount of water and sewerage matter has to be promptly removed through the drainage system.

The sewers of the city are divided into two systems or zones—high level and low level. The high-level system embraces approximately the whole of the city west of a line passing along Stranmillis Road, University Road, Sandy Row, Distillery Street, Cullingtree Road, Millfield, Upper Library Street, and North Queen Street; while the low-level system comprises the whole of the city area east of that line and the district on the east side of the River Lagan, excluding the districts of Sydenham and Knock, which, when completed, will drain into a separate outfall at Sydenham. Under the Belfast Main Drainage Act of 1887 both the high and low level main trunk sewers were constructed, and the maximum distance along which the sewage is conveyed is about four miles. The discharging capacity of the high-level sewer is 8,300 cubic feet per minute, and is equal to a rainfall of 2 in. per twenty-four hours over the area which it drains, or about twelve times the normal sewage flow, estimated at 30 gallons per head of the population. The discharging capacity of the low-level sewer is 8,100 cubic feet per minute, and is equal to about 1½ in. of rainfall per twenty-four hours over the area drained, or about sixteen times the normal average flow. At No. 1 Pumping Station in Duncrue Street the sewage of the low-level sewer is raised to the outfall sewer, which is a continuation of the high-level sewer, and from

this point conveys the total sewage flow to a sedimentation tank having a capacity of 4½ million gallons (now being increased to over 7 million gallons, or half the daily dry-weather flow), from which the discharge ultimately will be restricted to the first three and a half hours of ebb tide. The outfall sewer is capable of discharging when full about 15,000 cubic feet per minute, or about twelve times the total normal sewage flow. The discharging capacity of the outfall sewer is rather less than the combined discharging capacity of the high and low level sewers, but it is relieved during times of heavy rainfall by storm overflows on the high-level sewer. The sewage purification works, together with No. 2 Pumping Station, have been constructed on lands reclaimed from Belfast Lough lying east of the Northern Counties Railway. The problem of sewage purification as it presents itself in Belfast is, as previously stated, of more than ordinary difficulty, owing to the sluggish tides and the large areas of shallow water in Belfast Lough, both of which circumstances seem to favour the growth of the green seaweed *Ulva latissima*. There can be little doubt from the investigation of Professor Letts, Queen's University, Belfast, that the presence of this weed in any water is indicative of sewage pollution, and also that the weed itself, when cast up in masses on the beach and allowed to decay and ferment, always gives rise to a nuisance. For the past ten years the question of the proper treatment of the sewage of Belfast has been before the Corporation, who, with the aid of chemical, biological, and engineering experts, have been endeavouring to obtain a solution of the problem which should, without involving absolutely prohibitive expenditure, satisfy the many interests involved. The earlier experiments were made with double contact beds (the sewage treated on them having been previously screened), and the experiments being mainly directed to the determination of the most suitable and economical medium both as regards size and nature.

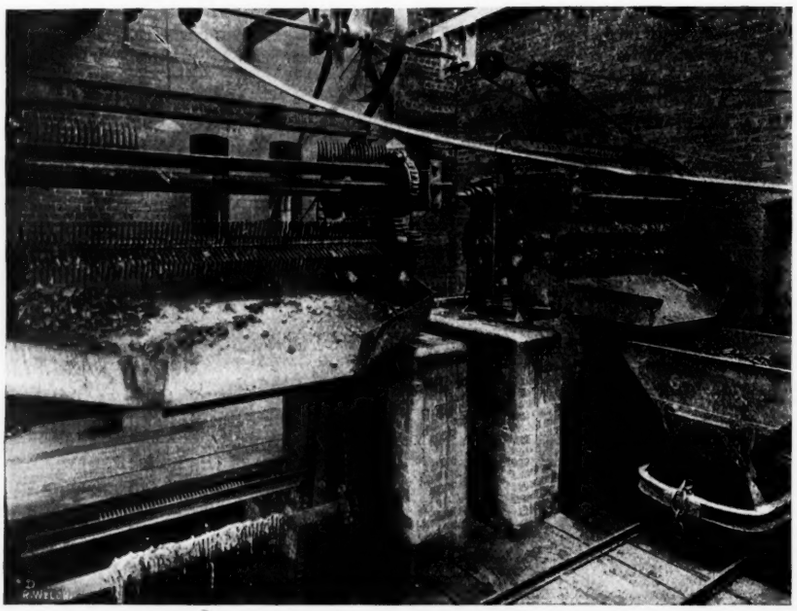

Fig. 1.—Sewage screening plant.

At the outset it was considered that a very moderate degree of purification would produce an effluent sufficiently good for discharge into the large volume of tidal waters of Belfast Lough; but experiments made by Professor Letts on the growth of the *Ulva latissima* revealed the fact that if the growth of this weed was to be stopped, or even considerably reduced, it would be necessary to produce an effluent free not only from free ammonia, but also from those nitrogen compounds such as nitrates, the presence of which in an effluent is ordinarily regarded as evidence of *purification*.

Certain experimental contact beds had been found (when dealing with sewage which had previously undergone screening and about six or eight hours' septic tank treatment) to give an effluent containing comparatively small quantities of nitrogen in any form (the purification reached in some instances 90 per cent. free and 75 per cent. in albuminoid ammonia, with small quantities of nitrate); but these beds were found to be rapidly silting up, and, moreover, the area required for sufficient contact beds properly to deal with the sewage of Belfast was quite out of the question, considering the land available.

Percolating filter beds, with revolving sprinklers, dealing with screened and sedimented sewage, were next experimented on, with results which, as regards economy of space and freedom from silting up, were highly satisfactory. The effluent produced was, moreover, from the point of view of purification as ordinarily understood, an exceedingly good one; but it contained quantities of nitrogen in the form of nitrates which it was recognized would still provide an undesirable amount of food for the ulva.

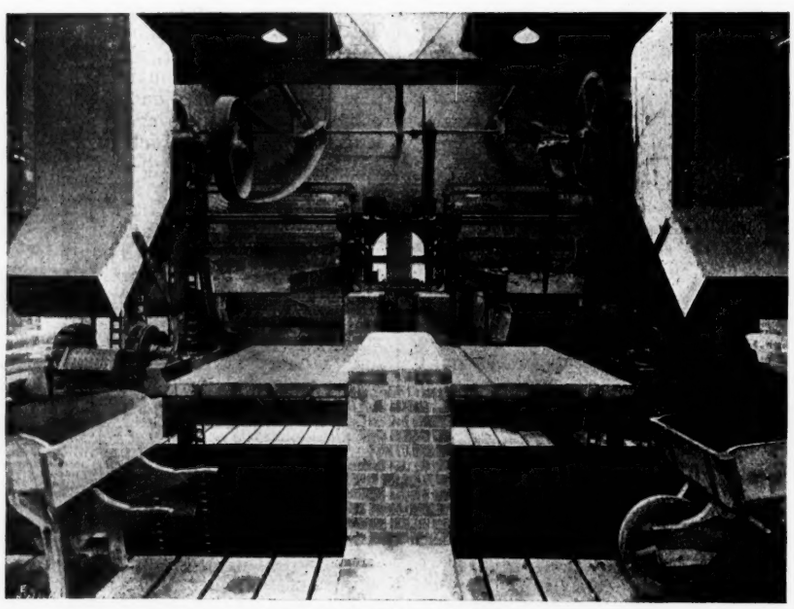

Fig. 2.—Detritus elevators.

After an elaborate series of experiments, Professor Letts showed that by mixing the effluent from the percolating filter with sedimented sewage in about equal quantities, and again treating the mixture on contact beds, the organic matter in the sewage was oxidized at the expense of the nitrates in the filter effluent, the net result being a reduction in the total quantity of ulva-growing pabulum. These researches, which were fully described in Professor Letts's final report to the Belfast Corporation on the purification of the Belfast sewage, have formed the basis of an original and unique scheme of purification applicable to the sewage of an area such as Belfast, and when a highly nitrified effluent is

undesirable or objectionable. The carrying out of this method does not necessarily involve the construction of special contact beds, as the storm water filters can be used for the denitrifying process, the latter being suspended in time of storm.

The question of the disposal of the sludge resulting from the sedimentation of the sewage has, of course, received due attention, and it is proposed to deal with the sludge in two different ways at the two sewage outfalls, the method proposed for the main outfall works being that of conveyance of the sludge to sea by steamer, while at the Sydenham outfall, on the County Down side, it has been decided

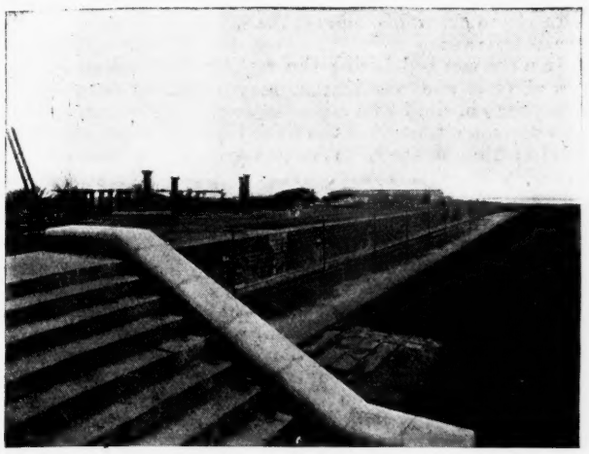

Fig. 3.—Sedimentation tanks—inlet end.

to adopt Dibdin's slate beds, as the absence of deep water approaches to the site of the latter works makes the steamer method of disposal of the sludge expensive and inconvenient; in fact, a comparison of the capital cost of Dibdin slate beds with the capitalized annual expense of removing the sludge by steamer shows a balance in favour of the steamer method for the main works and of the slate beds for the Sydenham works.

A further argument in favour of the adoption of Dibdin slate beds for these works is found in the conversion by them of the sludge undigested and remaining in the beds into inoffensive humus.

Yet another solution of the sewage problem as it affects

Fig. 4.—Sedimentation tanks—outlet end.

Belfast has been put forward, namely, to abandon (at least as regards the main outfall) all bacterial treatment, and to depend solely on screening, sedimentation, and the sludge removal, with restriction of the discharge from the sedimentation tank to the first half of the period of ebb tide. The advocates of this scheme are not agreed as to the extent to which the carrying of it into effect would reduce the growth of the ulva in the Lough, but they suggest that any weed which still continues to grow might be collected and removed as it is thrown on the beach; their contention being that it would be better to spend what might possibly prove a continually diminishing annual sum on such collections and removal than at once to incur a large capital expenditure on works which might prove less beneficial than it has been hoped they would.

At the present time an effort is being made to deal with this ulva nuisance by a joint board formed of members elected by the sanitary authority of Belfast, Holywood, and Castlereagh, who have at their disposal a sum of £2,000 annually, which they expend on the collection of the weed from the foreshore. Some 2,000 tons of weed were removed by this board during the last year, but their operations were prematurely brought to a close in September by the exhaustion of the funds at their disposal. No attempt has been made to deal with the deposits of ulva on the

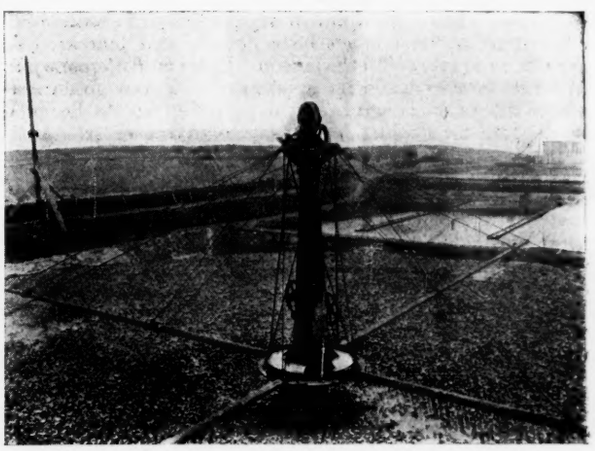

Fig. 5.—Rope-driven sewage distributor (Cutler's patent).

County Antrim side, except by the Belfast Corporation within their boundary.

II.—E. A. LETTS, D.Sc., Ph D.,

Professor of Chemistry, Queen's University, Belfast.

ON NUISANCES CAUSED BY CERTAIN GREEN SEAWEEDS.

[ABSTRACT.]

PROFESSOR LETTS, after describing the geographical features of the River Lagan on which Belfast stands, and giving an account of its sanitary history during the

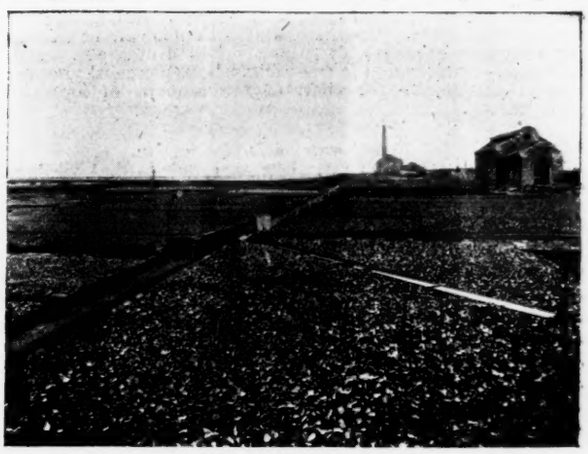

Fig. 6.—Contact beds.

last sixty years, discussed the chemistry of the green seaweed nuisances, to which the sewage difficulties of Belfast are mainly due, and recorded a number of a series of investigations conducted by himself and his students. The *Ulva latissima*, when packed in flasks of seawater, rapidly ferments, the fermentation occurring in two stages, each stage being brought about by a specific micro-organism difficult to isolate. In the first stage hydrogen and carbonic anhydride are evolved, fatty acids being simultaneously produced. In the second stage the sulphates abundantly present in the tissues of the ulva are reduced to sulphides, sulphuretted hydrogen eventually formir. The author then showed that *Ulva latissima*

and some green seaweeds contained so much nitrogen as to resemble an animal rather than a vegetable product, and only occurs in any quantity in seawater polluted by sewage; the ulva absorbs nitrogen in the form of ammonium salts with great rapidity from seawater, and also takes up nitrogen from dissolved nitrates, but much less rapidly.

He also noticed in 1902 that green growths made their appearance on the surface of the experimental contact beds at the Belfast outfall works, and in the following spring this developed into large patches of *Ulva latissima*. The fronds were in many cases 4 in. or 5 in. broad. Another green seaweed—*Enteromorpha compressa*—appeared at the same time in the lagoon into which the effluent from the contact beds flowed, and increased so rapidly as nearly to fill the lagoon. Later on *Enteromorpha intestinalis* also made its appearance. These green seaweeds the author regards as the purifying agents designed by Nature for dealing with sewage in seawater. As it seemed that the growth of green seaweeds in quantity was mainly due to the ammonia in sewage, but was also encouraged by nitrates, it was evident that a scheme of sewage treatment to meet the case must be designed, so as to get rid, as far as possible, both of ammonia and nitrates, and also of solids which might eventually evolve ammonium. The ulva cannot absorb albuminoid bodies.

Experiments on a large scale in these directions were undertaken, and the following is a summary thereof:

(A.) Effects of Treating Sewage on Double Contact Beds only.
The mean results of this series of experiments showed a removal of 51.5 per cent. of the free ammonia and of 71 per cent. of the albuminoid ammonia, while no nitrates were formed. Systematic analysis of the dissolved gases, both in the original sewage and in the resulting effluents, revealed the important and interesting fact that nitrogen was evolved in the gaseous state during the purifying processes, the average being as much as 12 per cent. of the total nitrogen lost (as shown by the analyses) during the treatment, while in one particular experiment it amounted to 20 per cent.

(B.) Effects of Treating Sewage on Double Contact Beds, Preceded by Septic Tank Treatment.
The mean results of two series of experiments were as follows: Purification in free ammonias, 86 per cent.; in albuminoid ammonia, 72 per cent.; production of nitrates, 25 per cent. of the amount of ammonia disappearing.

(C.) Effects of Treating Sewage on Percolating Filters, or "Sprinklers," Preceded by Septic Tank.
Several series of experiments were performed. It will be sufficient to give the results of one: Height of bed, 5.5 ft.; size of medium, 1–0.5 in. Sewage treated per cubic yard of medium per twenty-four hours, 164 gallons. Period of septic action, six hours. Purification in free ammonia, 96 per cent. Production of nitrate, 79 per cent. of the amount of ammonia disappearing.

(D.) Experiments on Denitrification.
It was clear from the preceding experiments that, while an effluent virtually free from ammonia can be produced, it can only be obtained at the expense—so to say—of considerable nitrate production.

The next branch of the inquiry was consequently directed towards the possibility of getting rid of these nitrates on a practical scale. The author first ascertained that when nitrates are added to the effluent from a septic tank they are rapidly destroyed—all the nitric nitrogen added (which amounted to 2.5 parts per 100,000 of the effluent) disappearing in twenty-four hours. He also proved that the action was due to micro-organisms, and that its general character was that of a combustion, all the oxygen appearing in the liquid as carbonic anhydride, while its nitrogen was evolved either as such (in four out of eight experiments the theoretical quantity was found in the dissolved gases) or as oxides of nitrogen.

He next tried the effects of mixing the nitrated effluent from a percolating filter with the effluent from a septic tank, and found that destruction of the nitrate always occurred after some time, and in some cases amounted to a complete loss after a period of twenty-four hours. But such a prolonged period is out of the question as a practical method of treatment. The author's experiments were therefore next directed towards the possible discovery of a method for accelerating denitrification.

A clue to such a method seemed to be furnished by a theory of contact bed action, which he had been gradually led to form from his observations, the outlines of which are as follows:

In a contact bed during the resting stage the conditions are aërobic, and nitrification may occur not only during this phase in the liquid adhering to the solid medium, but also for some time after the fresh liquid is admitted. The solid medium of the bed is coated with a gelatinous layer, probably consisting of organic matter saturated with micro-organisms, in which latter both nitrifying and denitrifying species are present.

When the beds are full, diffusion of the liquid occurs continuously both into and out of these layers. The ingoing stream carries both nitrates and dissolved oxygen with it. The latter is first seized on and absorbed by the organic matter, and the liquid, now free from oxygen, diffuses still further into the layer and then becomes denitrified. The outgoing stream is therefore charged with dissolved nitrogen but is free from oxygen, and, mingling with the undiffused liquid, produces a mixture which contains a progressively decreasing amount of oxygen, but also progressively increasing quantities of nitrogen.

The idea therefore presented itself that by submitting a mixture of a highly nitrated—for example, percolating filter—effluent with the septic tank effluent to treatment on a contact bed, a double effect might be induced—namely, destruction of nitrates in the first and purification in the second.

Experiments on a practical scale have fully justified these views; and while the most favourable conditions have probably not been as yet ascertained, the following results may be given. (See table below.)

In the second series (of 23 experiments) the mixture treated on the denitrifying bed varied as shown. The figures given for the percentage reduction of free ammonia (in the original sewage) and for the nitrate (in the sprinkler effluent) are the mean results of all the (23) experiments.

It will be seen that in the first series the reduction of nitrate was very considerable, while that of the ammonia was relatively small. But in the second series, on the other hand, these effects are reversed, and it is somewhat difficult to account completely for these differences.

It may, however, be mentioned (*a*) that in the first series the mean quantity of free ammonia was some 14 per cent. *higher* than the corresponding amount in the second; while (*b*) the nitrate in the sprinkler effluent was about 22 per cent. *lower* in the first series than in the second; also (*c*) that in the second series the ratio of sprinkler to septic tank effluent was in many of the experiments much higher than that of the first. And the two series of experiments were performed at different times of the year, and temperature may very possibly have had an effect.

The author has calculated that with efficient sedimentation, coupled with the method of treatment sketched above, it should be possible to reduce the effect

Number of Experiments Performed.	Mixture Treated in "Denitrifying" Bed.		Working Cycle of Bed.	Percentage Reduction in:			
	Sprinkler Effluent.	Septic Tank Effluent.		Oxygen Absorbed. Test (4 hrs., 0.80° F.)	Albuminoid Ammonia.	Free Ammonia.	Nitrates.
6	1 Vol.	1 Vol.	3 hours' contact, 3 hours' rest	57.6	46.2	69.7	89.4
23	2 Vols.	1 Vol.	4 hours' contact, 2 hours' rest	—	—	87.0	53.5
	4 „	3 Vols.					
	1 Vol.	1 Vol.					

of the sewage on the growth of the ulva by about 80 per cent.

III.—THOMAS CARNWATH, M.B., D.P.H.Cantab.,
Assistant to the Medical Officer of Health, Manchester.

EXPERIMENTS ON THE QUARANTINE OF SHELLFISH FROM POLLUTED AREAS.

THE following investigation and experiments were made during the course of a bacteriological survey of Belfast Lough. They were carried out with the object of ascertaining, first, whether any selective action as regards the bacteria indicative of sewage pollution occurs in the bodies of mussels; and, secondly, the effects of "relaying," or of a period of quarantine in comparatively pure water, on the number of *B. coli—B. coli* being selected as the organism most closely allied to the *B. typhosus*, and from whose behaviour, therefore, inferences might reasonably be drawn as to the fate of the more dangerous germ. The methods adopted have been described elsewhere.[1] The mussels employed were collected at low tide from a sewage-contaminated bed which is situated on the south shore of Belfast Lough between Holywood and Cultra. Four different sets of samples of mussels from this bed, together with corresponding samples of mud and of water, were examined bacteriologically, with results which are detailed in Table I. Table II, which is based on the above, enables one to compare the results more readily.

These tables show how the bacterial content of the mussel depends on that of its environment; that the water exerts an influence is shown by the proportion of *B. coli* to total number of organisms, which is practically the same in both. On the other hand, the mud accounts for the large number of *B. enteritidis sporogenes*. In neither case is the proportion very appreciably altered from that which obtains in the surrounding medium, from which we conclude that, so far as sewage bacteria are concerned, selective processes are not at work inside the mussel shell. In other words, the conditions found there are not more favourable for the growth or for the survival of these micro-organisms than those existing outside.

To test the effect of "relaying" on these mussels the following experiments were made:

Experiment I.

About sixty mussels were collected, and taken on the same day to the Laboratory of the Ulster Fisheries and Biological Association, Larne. After a preliminary cleansing of the outer surface of the shells with tap water, they were taken out into the harbour and placed in a large fish box which was anchored to the outer end of the old pier.

Samples were removed at intervals for examination.

At the beginning of the experiment each mussel contained 5,000 *B. coli* (average of 5 mussels). On the fourth day this number was reduced to ten (average of three mussels). On the ninth day the number per mussel was one (average of six mussels). On the twelth day, of 10 mussels examined singly,

3 contained no *B. coli*.
5 contained each 1 *B. coli*.
2 contained each 100 *B. coli*.

TABLE II.—*Corresponding to every 10,000 Bacteria capable of Growing in Gelatine at 22° C., there are:*

	"Blood Heat" Bacteria (Agar 37° C.).	B. Coli.	B. Enteritidis Sporogenes.	Streptococci.
Water ...	526	42	0.4	15
Mud	1,379	7	7	99
Mussels ...	1,512	40	7	66

Corresponding to every 10,000 Bacteria capable of Growing on Agar at 37° C., there are:

	Gelatine (22° C.) Count.	B. Coli.	B. Enteritidis Sporogenes.	Streptococci.
Water ...	188,707	800	7	280
Mud	72,215	55	55	137
Mussels ...	61,426	266	44	437

Experiment II.

The mussels were treated as in Experiment I, except that before being taken to the "quarantine ground" they were placed for thirty-four hours in a shallow basin containing an emulsion of a culture of *B. coli* isolated from the mud of the mussel-bed.

At the beginning of the experiment each mussel contained 500,000 *B. coli* (average of 6 mussels). On the fourth day this number was reduced to 5,000. On the seventh day, of 6 mussels examined,

1 contained no *B. coli*.
3 contained each 10 *B. coli*.
1 contained 1,000 *B. coli*.
1 contained 10,000 *B. coli*.

The last two looked unhealthy; the shells were not tightly closed.

On the thirteenth day, of 6 mussels examined,

4 contained each 1 *B. coli*.
1 contained 100 *B. coli*.
1 contained at least 100,000 *B. coli*.

This last looked a very unhealthy specimen.

On the eighteenth day, of 6 mussels examined,

3 contained each 1 *B. coli*.
1 contained 10 *B. coli*.
2 contained each 100 *B. coli*.

TABLE I.

Samples.		Number of Bacteria growing on		Number of B. Coli.						B. Enteritidis Sporogenes Test.						Number of Streptococci.				
		Gelatine at 22°.	Agar at 37°.	0.1	1	10	100	1,000	10,000	0.1	1	10	100	1,000	10,000	0.1	1	10	100	10,000
Water	I	1,300	50		+	−	−	−	−	−	−	−	−	−	−	+	−	−	−	−
	II	1,104	80			+	−	−	−	+*	−	−	−	−	−	−	−	−	−	−
(Numbers are given per c.cm.)	III	3,550	150			+	−	−	−	−	−	−	−	−	−		+	−	−	−
	IV	1,625	80			+	−	−	−	+*	−	−	−	−	−	+*	−	−	−	−
Mud	I	91,304	10,434			+	−	−	−			+	−	−	−		+	−	−	−
	II	70,545	17,348				+	−	−				+	−	−		+	−	−	−
(Numbers are given per gram)	III	422,000	73,870				+	−	−				+	−	−				+	−
	IV	716,064	77,833				+	−	−				+	−	−				+	−
Mussels	I	80,000	30,000				+	−	−				+	−	−			+	−	−
	II	54,750	7,000				+	−	−			+	−	−	−				+	−
(Numbers are given per mussel)	III	1,052,500	153,000					+	−				+	−	−				+	−
	IV	398,300	50,000				+	−	−				+	−	−		+	−	−	−

* Present in 5c.cm.

All these specimens appeared to be quite healthy.

The experiments made were unfortunately rather few in number, still they justify, I think, the following conclusions:

1. Though the mussel is from its mode of life[2] exposed to considerable risk of infection by *B. coli* and other sewage organisms, if such are present in its water of alimentation, it does not, when healthy, furnish conditions favourable for their multiplication or survival. On the contrary, there is sufficient evidence to show that the conditions are distinctly unfavourable.

2. Infected mussels when placed in pure water gradually rid themselves of *B. coli*—the greater number (over 99 per cent.) disappearing within the first few days. Thus a quarantine period of even a single week would be sufficient to reduce the number of these bacilli enormously, and consequently would diminish the risk of the mussel serving as a medium for the transmission of the occasional and much less resistent pathogenic germs (for example, *B. typhosus*, cholera vibrio).

REFERENCES.

[1] Pollution of Estuaries and Tidal Waters (Appendix to Fifth Report of Royal Commission on Sewage Disposal), p. 265 et seq. [2] Viallanes, *Comptes Rendus*, June 7th, 1892.

DISCUSSION.

Dr. DUNBAR (Hamburg) said: I have only come to listen and to learn, but, since I have been so kindly asked to speak before this meeting, I shall be pleased to make a few general remarks about our experiences in Hamburg regarding sewage in tidal waters. But first of all I wish to express my high appreciation of the highly interesting and thoroughly scientific work that has been carried out by Professor Letts in Belfast. The difficulties that have been met with there were, however, quite unique. Excepting such singular occurrences as the nuisance created by the growth of certain algae, and difficulties arising from local conditions in some few places, the disposal of sewage in tidal waters has until recently been looked upon as an easy task. The sewage was either not treated at all—if it could be run into such waters—or it was simply screened and thereby freed from larger particles of suspended matter, or it was chemically treated, as, for instance, in London or in Glasgow, where such treatment soon improved the rivers and estuaries to such a degree that the former nuisances disappeared entirely. In recent years the question of the dangers from shellfish taken from sewage-polluted waters has been raised and frequently urged by epidemics of infectious diseases that could be traced to the use of such shellfish. It was thought necessary by many authors to treat all sewage that was to be let into tidal waters where shellfish were taken from, so as to eliminate or destroy all pathogenic germs contained in it. We have no method of sewage purification that yields effluents which are free from pathogenic germs, and so it could only be a question of sewage disinfection. It has been thought quite feasible to disinfect sewage. Papers have been published by recognized bacteriological authorities, stating that the addition of lime, about 1 in 2,000, to crude sewage would suffice to destroy all cholera and typhoid bacilli, as well as the many other pathogenic germs of equal resistance within a couple of hours or even in a shorter time. This idea prevailed in 1892, when Hamburg had a severe cholera epidemic, and a number of schemes were brought forward proposing to add a certain amount of milk of lime to the sewage in the sewers. It was believed that the disinfecting process would be completed before the sewage reached the outlet. Experiments that I have made soon convinced me that such a proceeding would mean only the waste of large sums without any effect. In the course of the last sixteen years all the disinfectants that could come in question have been tried, and it was ascertained that hypochloride of lime is the best and cheapest disinfectant for sewage, but that even this does not penetrate the suspended matter always found in crude sewage, so as to warrant a complete disinfection. Cholera vibrios and typhoid bacilli that were injected into particles of faecal matter could not be destroyed even by quantities of disinfectants, including hypochloride of lime, that would be prohibitive on account of their cost, and the results were bad, even after so long an action as twenty-four hours. The results of these experiments proved that it is an impossibility to disinfect crude sewage. And even if all particles of suspended matter larger than 1 mm. in diameter are screened out of the sewage it is found very difficult to obtain a chemical action resulting in the destruction of all coli bacilli, which, as is well known, are found in every domestic sewage in very large numbers, and show a resistance against chemical disinfectants well comparable with that of typhoid bacilli. The intestinal bacilli are, as it seems, covered with a slimy substance which protects them from the chemical action. Following this idea, I have treated sewage in septic tanks, believing that the slimy and other organic matter which covered the bacteria in question would thus be digested in the same manner as fishes, pieces of meat, cartilage, vegetables, and many other substances that I placed in a septic tank and found entirely dissolved within a comparatively short time. Moreover, the larger pieces of suspended matter were kept back in the septic tank, and only very small quantities of firm suspended matter escaped with the effluent. The results were found very satisfactory. A sewage that in crude state would not be disinfected within six hours by chloride of lime 1 in 1,000 could be nearly sterilized by this chemical in a proportion of 1 in 10,000. But it was found that such results could only be obtained if the process of septicizing, or, as I ought to say, digestion, is carried out according to certain rules. If the sewage remains too long in the septic tank, so much sulphuretted hydrogen is formed that the hypochloride of lime is thereby absorbed and made inactive. I cannot dwell upon these very intricate experiments, which have taken up much time, any longer to-day. But I hope to have demonstrated clearly that the disinfection of sewage is by no means simple and cheap, but a very difficult and costly affair, and that it is an impossibility, practically speaking, to disinfect crude sewage by chemical action. And other applicable methods we have not got. It may interest you to learn what measures Hamburg has taken in this line. Hamburg is situated within the estuary of the Elbe river, about sixty miles from its mouth, and is still using the river water to a large extent. After the severe cholera epidemic, the intake of the water-works was laid further up the river, and a very careful system of filtration was introduced. The few small towns further down the river were supplied with deep well water, excepting Altona, a Prussian city which at the time is still using river water, but is searching for deep well water in order to become independent in its water supply from the river. These measures having been taken, we are of opinion that all we shall have to do with our sewage will be to treat it to such an extent, that its traces cannot be found in the river by sight or smell. We accomplish this by passing all of the sewage through screens, which take out all faecal matter, orange-peel, corks, or other floating matter. But we disinfect regularly all the liquid waste water coming from the stations for infectious diseases in our hospitals, from the disinfection stations, the hygiene institute, the emigrants' station, and some other places. Besides this, we send disinfectants into every private house where a case of typhoid fever is being nursed, giving detailed instructions how to use them. We are quite aware that by this means we cannot prevent all infectious material from getting into the river, but at the same time we believe that we should not achieve much more than now, if we were to treat the whole bulk of our sewage by chemicals.

Dr. W. JAMES WILSON (Belfast) demonstrated a new method of isolating the *B. typhosus* from infected water. The principle consisted in evaporating the water down to 10 c.cm. and then putting the residue on to special solid media. The evaporation was carried on under reduced pressure, at 42° C., and it was found that twenty-four hours was required for the evaporation of 4 litres. The pressure was reduced by means of two water filter pumps. As an example of the efficiency of the method, he cited the following. Thirty-nine typhoid bacilli and 4,000 *B. coli communis* were added to 4 litres of ordinary Belfast tap water. The water was evaporated down to 10 c.cm. in twenty-four hours, and the residue put on Fawcus's modification of Conradi's brilliant green medium. To the clear colonies Widal's test was applied, and several of them gave positive results, and further tests showed that they were composed of typhoid bacilli.

Sir PETER O'CONNELL, M.D. (Belfast), said: Outside the circle of those directly concerned the peculiar difficulties of

the sewage problem as it affects Belfast do not seem to be fully appreciated. Although several other towns suffer in a greater or less degree from the ulva nuisance, in none, so far as I am aware, is the nuisance so acute as in Belfast and neighbourhood, and I think I am safe in saying in no other place has so much time and skill been devoted to the study of the growth and habits of the weed and to the question of abolishing, if possible, the nuisance arising from it. The mere existence of differences of opinion amongst those most closely concerned with the question shows the difficult nature of the problem, and I think it will be a matter for congratulation if the rumoured visit of the Royal Commission on Sewage Disposal to Belfast should result in something like an authoritative settlement of the question. The amount of new ground to be opened up in the way of acquiring more accurate knowledge of the conditions of existence of the weed is, however, very great, and it would be unreasonable to expect any immediate and dramatic settlement of the questions at issue. Even twelve months' observations and experiments would probably not completely reveal all that it is necessary to know. In the meantime, however, it is satisfactory to know that the Local Government Board has granted a loan of £35,000 to be expended in connexion with *sedimentation* of the sewage, and that the Corporation is pushing on as rapidly as possible with the works authorized. I understand that the existing sedimentation tank and arrangements effect a removal of, on the average, 70 per cent. of the total solids of the sewage, and 17 to 20 per cent. of the total nitrogen of the sewage. This means, of course, a corresponding reduction of the ulva food, and it is not too much to hope that, even if no additional methods of purification are adopted for an interim year or two, a substantial reduction of the dimensions of the ulva crop will result. In the meantime, I think, the important fact for the general public to bear in mind is that the science of sewage purification is well acquainted with methods of dealing, at no prohibitive cost, with the sewage of even as large a town as Belfast, and of turning out an effluent as pure chemically as many waters used for domestic purposes, but that this very effluent on account of its purity (in the sense of containing nitrates) is undesirable where local circumstances favour the growth of seaweeds, and that the waters of uncontaminated rivers themselves contain the same ulva food, although, of course, not in such concentration.

Dr. LOUIS PARKES (President) assured Professor Dunbar that the difficulties of disinfecting crude sewage were fully recognized in this country. Attempts had been made to do so, but there was not only the scientific difficulty, but the administrative, connected with the disinfection of storm waters as well as of crude sewage. It would be no use to disinfect the sewage unless the storm overflows were disinfected as well. With regard to what Dr. Dunbar had said about the Germans imitating the English teaching, they were flattered to hear that, but certainly they had something to learn from the Germans. If, as Professor Dunbar had said, steps were being taken to destroy infected organisms, a move was being made in the right direction. He thought it would be a good thing if something effectual were done in that way in this country. He would like to ask Professor Letts whether he had made any experiments regarding the effect of sulphate of copper on *Ulva latissima*.

Professor LETTS, in reply, said that some years ago he made an experiment, and he found that a small proportion of sulphate of copper killed the ulva. They found that an experiment on a practical scale would cost about £500, and he thought it was worth consideration by the city authorities whether two or three doses of sulphate of copper might not be employed at the proper season. He could not help thinking that Professor Dunbar in Hamburg was working on entirely right lines, because they all knew that experiments had proved that the sterilizing of crude sewage was not successful owing to the prohibitive cost.

The PRESIDENT, in moving a vote of thanks to the various speakers, said that on the general question of oyster and mussel beds he thought they should be in agreement as to the possibility of these shellfish freeing themselves from sewage pollution. It was probable that the public would find safety in eating shellfish by adopting the course suggested—namely, by placing them in pure water for a time after they were grown. Of course, the exact time taken should be very carefully determined.

Mr. P. C. COWAN, Engineering Inspector to the Irish Local Government Board, said it was a great privilege to second the resolution, and to have been present to hear the papers which had been read. He was an exceedingly anxious inquirer into the subject, and he should have liked to have heard more details in regard to the Tees estuary. No one was better acquainted with the valuable work done by Professor Letts than he was. He had heard him on many occasions speaking on that interesting problem which so vitally affected Belfast and the surrounding districts. It gave him satisfaction to think that the Belfast problem was now likely to be solved as soon as it might be by those best able to do so. There was in many minds the idea that questions of that kind could be solved by an expert in any small town. Belfast was inclined to become impatient at the time which had passed without a solution of the question, but they were recognizing now—and what Professor Dunbar had said bore out the statement—that modern problems in connexion with the purification of sewage were of extreme complexity. Belfast people had had a great trial upon their patience, and also upon their financial resources, but they might now be satisfied that the difficult problem was in excellent hands, and would be solved at the earliest possible time.

MEASLES IN SCHOOLS: AN ACCOUNT OF A RECENT EPIDEMIC IN ST. HELENS.

By JAMES J. PATERSON, M.B., D.P.H.,
Assistant Medical Officer of Health.

AMONG the infectious diseases which are particularly prevalent among school children there is still a considerable number against which we have yet to form a satisfactory plan of campaign. Of these, measles undoubtedly takes the chief place, for in it we have a disease which is the most widely spread of all children's diseases, to which practically every child is susceptible, which is of the most infectious nature, and which is more or less responsible for an unduly large proportion of deaths, especially among very young children. To some extent we are handicapped in dealing with it from our want of exact knowledge as regards its epidemiology; but, as the results of administrative methods of control accumulate, we can more confidently look forward to a time when its ravages in infant departments will be substantially diminished. A record of death-rates from measles during the past thirty-three years in St. Helens shows that there has been a fairly regular succession of outbreaks every second or third year, and that at the beginning and end of that period these outbreaks have assumed very large proportions as compared with those occurring in the middle period.

The recent outbreak with which this paper deals belongs to the class of major outbreaks, and was preceded by a year of very low prevalence, which in turn succeeded a year of high prevalence.

Towards the end of January of this year cases of measles began to occur with increasing frequency in the schools on the western side of the town. Throughout February the schools nearer the centre of the town became involved, and by the beginning of March the schools lying to the eastward of the borough began to show signs of the approaching epidemic. This steady progression eastward was a most noticeable feature of the epidemic, but apparently there is no reason to correlate it with the prevailing direction of the wind, for during that time the number of hours in which it blew in an easterly direction is almost precisely the same as that in which it had an opposite direction.

Our main source of information as regards the occurrence of cases was a system of notification by teachers and school attendance officers. Under a local Act teachers must notify to the medical officer of health all cases of infectious disease that may occur in school. The head of every department is provided with a book of forms for this purpose, and teachers are also requested to notify "contacts."

As soon as practicable after the receipt of a notification a school nurse visits the house and makes inquiries

with a view to confirming the reputed diagnosis. As each case is verified a note is sent to the school excluding the patient and certain other members of the family for a period of not less than three weeks. The only children who are allowed to attend school are those in the upper standards who have had a previous attack. In spite of these precautions, the disease continued to spread rapidly, and in several instances an outbreak in a school was definitely traced to a particular child who had been sent to school in an infectious condition. In many of the schools a very strict watch was kept by the teachers for such cases, but teachers alone cannot be expected to have the necessary skill to diagnose the disease sufficiently early to permit efficient steps being taken to prevent its further spread. The exclusion of "infects" and "contacts" so reduced the attendance in many of the schools that the question arose as to whether classes could be profitably conducted with an attendance bordering on 60 per cent. From a purely educational point of view, it is doubtful if the teachers can be expected to devote their usual energy in teaching a class so depleted in numbers, the more so as the bulk of the work must be gone over again when the scholars return. This disorganization of school work is certainly a point worthy of due consideration. On the financial side of the question I need only remark that, with the disappearance of Article 101* of the Code, the monetary loss to the education authorities caused by the exclusion of individuals is a serious one indeed.

A consideration of these points, together with the plain evidence that our efforts to limit the spread of infection had not met with any degree of success, led to the closure of eighteen infant departments during February and the first week of March. A week later, as the remaining twenty schools began to show signs of becoming involved, they were closed until the epidemic abated. Thus, all infant departments were closed for a period of eight weeks, which included the Easter holidays. From the beginning of January to the end of April there were altogether 1,367 cases of measles brought to our notice. These were distributed among 860 families in the following way:

One case in	509 families	... ...	= 509 cases.
Two cases in	227 ,,	... ...	= 454 ,,
Three ,,	98 ,,	... ...	= 294 ,,
Four ,,	20 ,,	... ...	= 80 ,,
Five ,,	6 ,,	... ...	= 30 ,,
	860		1,367

The following table (A) sets out the number of primary and secondary cases occurring at various ages and the corresponding deaths:

"Primary" cases are the first which occur in a family; "secondary" cases are those which occur in the same family not earlier than a week from the onset of the first case. "School" cases are those in which the infection most probably occurred at school, there being no previous case in the house, and "home" cases are those occurring in children not attending school. The number of deaths was found by comparing the names and addresses in the Registrar's returns with those of the cases visited. The total number of deaths from measles for each age-period, as found in these returns, and the deaths occurring among the known cases, form a basis for calculating the probable number of cases. The following table sets out the results of that calculation:

TABLE B.—*Number of Deaths at each Age-period, and probable Number of cases, calculated from the Deaths.*

Age—Years.	Registrar's Returns.		Notified Cases.	
	Deaths.	Probable Cases.	Deaths.	Known Cases.
Under 1 ...	31	295	6	57
1 ...	63	489	13	101
2 ...	39	440	9	103
3 ...	12	230	7	137
4 ...	9	2,584	0	969
5 ...	13		6	
6 ...	1		0	
7 ...	1		0	
14 ...	1		0	
Totals ...	170	4,038	41	1,367

	Under 4 Years.	4 Years and over.	Totals.
Probable cases	1,454	2,584	4,038
Reported cases	398	969	1,367
Percentage of reported to probable cases	26.7	37.5	33.8

The fatality-rate for the group of younger children (under 4 years) works out at 8·8 per cent., and for the older group 0·67 per cent., or in the proportion of 13 to 1—a figure which demonstrates clearly how fatal a disease measles is to very young children. The next table, C, shows the number of cases notified from week to week and also the number of deaths (from the Registrar's returns). By comparing the figures it will be seen that during the first six weeks of the epidemic the cases under school age are few in proportion to those of school age, but that both attain their maximum about the same time. After closure of the infant departments there is a sudden drop in the number of cases, due largely to the loss of notification by teachers, but the steady fall in the number of deaths indicates that the epidemic began to abate from that date.

The maximum of deaths, it will be noted, occurs about a fortnight after the maximum of cases notified.

The efficacy of school closure in limiting the spread of such a highly infectious disease as measles is still a debatable question. Certainly our recent experience in

TABLE A.—*Incidence at Ages.*

	Ages.																	Totals.
	Under 1 Year.	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-18	Over 18	
Primary cases	15	36	40	67	123	232	206	114	57	26	24	9	9	3	1	1	1	964
Secondary cases	42	65	63		57	31	21	20	14	8	10	1	1	—	—	—	—	403
Totals	57	101	103	137	180	263	226	134	71	34	34	10	10	3	1	1	1	1,367
Deaths	6	13	9	7	—	6	—	—	—	—	—	—	—	—	—	—	—	41

Number of families, 860.

	Under School Age (4 years).	Infants and Standard I (4 to 8 years).	Standard II, etc. (8 to 14 years).	Above School Age.
Primary cases*	158	732	72	2
Secondary to school case ...	176	111	18	0
Secondary to home case ...	64	32	2	0
Totals	398	875	92	2
Deaths	35	6	0	0

* These include 52 "simultaneous" cases in which a child of school age sickened at the same time as a younger child not attending school—that is, a "home" child.

TABLE C.—*Number of Cases Notified, and of Deaths Week by Week.*

Week Ending—	Cases Notified.			Deaths (from Registrar's Returns).
	Under 4 Years.	4–14 Years.	Total.	
Jan. 7th	2	5	7	0
„ 14th	4	13	17	0
„ 21st	4	23	27	1
„ 28th (1 infant department closed)	11	35	46	0
Feb. 4th	11	60	71	2
„ 11th (2 more closed) ...	21	55	76	2
„ 18th	56	115	171	8
„ 25th (7 more closed) ...	60	112	172	11
March 4th (8 more closed) ...	45	120	165	14
„ 11th (all remainder closed)	34	80	114	19
„ 18th	22	53	75	19
„ 25th	17	42	59	33
April 1st	18	12	30	28
„ 8th	10	14	24	8
„ 15th	11	8	19	18
„ 22nd	2	10	12	4
„ 29th	2	9	11	3
May 7th (all infants' departments reopened)	4	2	6	4
„ 15th	10	13	23	1
„ 22nd	5	6	11	0
„ 29th	2	2	4	1
June 5th	5	5	10	1
„ 12th	2	2	4	1
„ 19th	1	2	3	2
„ 26th	3	25	28*	1
July 3rd	2	1	3	0
„ 10th (summer holidays; all schools closed)	4	8	12	3

* Twenty-one cases in one school.

St. Helens has been that it is in the schools that this disease finds its readiest means of spreading, and that when an outbreak has become very general, fresh sources of infection are imported almost daily into a school, so that the most careful weeding-out of "infects" and "contacts" fails to arrest its progress. At this stage it is only by total closure that one can hope to eliminate the school-infection factor which plays so important a part in its spread.

The former method was fully tried in the earlier part of this epidemic, when it most affected schools on the west side of the town, but it did not meet with any degree of success. The closure of the schools on the east side, in anticipation of their ultimately being affected to the same extent, was undoubtedly the factor which contributed most to the fall of the epidemic, while the prolonged closure of the schools prevented their becoming reinfected after the first crop of cases had run their course.

Action on the part of health authorities or of school officials in excluding individual cases cannot be expected to attain its full measure of success unless at the same time it be supplemented by the intelligent co-operation of parents in practising isolation of the infected children. This is manifestly difficult to obtain, but with systematic home visitation by a capable health visitor much may be done to educate public opinion in this matter. The responsibility, however, does not rest entirely with the parents, for we require a still greater willingness on the part of teachers and school authorities to sacrifice high averages of attendance for the sake of keeping children suspected of being infectious from their classes. Until these conditions are realized, measles and kindred infectious diseases may be expected to continue to exact a heavy toll of life and health among our infant population.

DISCUSSION.

Dr. D. J. MACKENZIE (Glossop) regretted the deletion of Article 101 from the Code, because it was not necessary to close a whole school in order that the Government grant might be obtained. He was of opinion that where measles had taken hold in a school there was little possibility of stopping its spread. He pointed out that in Austria Hungary when one or two cases of the disease occurred in a class, that class was closed for a period of two weeks. He considered that the reason why adults were not attacked was because they were immune from having had the disease in childhood.

Dr. W. T. BROOK FOX (Blyth) said that, as in so many other public health matters, the financial side bulked too largely, and that was one reason why there was in so many districts compulsory notification of erysipelas and not of measles. He agreed with Dr. Paterson that there was an increasing tendency among parents to isolate the children who were infected, even before medical advice had been sought.

Dr. HERBERT JONES (Hereford) said that it was very unsatisfactory to find that even after the adoption of the admirable administrative measures detailed by Dr. Paterson, resort in the end had to be made to the clumsy practice of closing large departments of the St. Helens schools. He pointed out that there were two methods of isolating an infected person—one in which the patient was kept apart from those who were well, and the other in which the uninfected were kept away from the infected. The latter method he had carried out in the Rhondda Valley and in Herefordshire by displaying in an infected house a card on which was printed in large type the name of the particular infectious disease concerned, and a request that no person should be admitted to the house except the regular occupants or those whose services were absolutely needed.

Dr. A. WALKER (Edinburgh) said that there was a tendency to organize a crusade against notification or other interference of the local authority in infectious diseases, and care should be taken not to push measures of control too far. Until the microbe was found it seemed hopeless to meet the case satisfactorily. Dr. Paterson had given them a very useful and practical paper on a not very grateful subject.

Dr. PATERSON, in replying, said that the method of closing schools during the incubation period was not effective in a very general epidemic, on account of "mixed crops"—that is, crops occurring at irregular intervals—and on account of reinfection after opening. Although it seemed almost hopeless to stop an epidemic when once it had gained a footing in schools, yet much might be done by preventing younger children becoming infected. The death-rate, as shown in the table included in the paper, was excessively high, and if the age of incidence could be postponed, it would be the means of saving many lives.

THE PREVENTION OF TUBERCULOSIS IN CATTLE,

WITH REFERENCE TO THE COMMUNICATION OF THE DISEASE TO MAN.

By JAMES NIVEN, M.A., M.B.,
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[ABSTRACT.]

[AFTER reviewing the recommendations of various Royal Commissions and other bodies on the prevention of tuberculosis, the writer outlined the steps taken in Manchester to deal with the disease.]

From 1896 onwards the cows within the city were examined by Mr. James King, M.R.C.V.S., with a view to see what was the extent of udder disease and of advanced tuberculosis generally, and samples from affected udders were submitted for examination to Professor Delépine. In this way a knowledge was gradually built up of what could justly be required in respect of cows affected with tuberculosis of the udder, while a considerable number of highly tuberculous cows were removed from the cowsheds.

Attention was directed to the efforts of Mr. Busck in obtaining a pure milk supply for the city of Copenhagen. Briefly, the principles on which this work was carried on

were that the farms from which milk was obtained should be the best procurable; that they should be under good veterinary supervision; that the milk should be cooled down to near freezing point directly after it was drawn from the cow; that it should be conveyed to the dairy in Copenhagen in refrigerating vans, tasted and tested, kept in ice, carefully freed by filtration from any residual dirt, and finally delivered to the consumer at a temperature but little above freezing point. The food of the cows was minutely regulated to ensure a good flavour. All this it was found possible to do, and to supply the milk at current prices. The conditions of milk supply and of service also were such that it was to the interest of the farmer and of the employees of the company to declare the existence of infectious disease on the farm or in their families. It seemed to the late Dr. Ashby and myself that a solution of the milk problem might be found on these lines, and in 1896 we visited Copenhagen and were kindly shown by Mr. Busck the details of his work, while we received his assistance in examining some of the farms supplying the company with milk. No more perfect organization has ever come under my observation, and I can testify to the admirable quality and flavour of the milk sold in the dairies of the company. On our return we took steps to interest a number of gentlemen, and a company, entitled "The Manchester Pure Milk Supply Company," started business on exactly similar lines. Financially, the company was not a success, and the hopes entertained of eradicating tuberculosis from a number of farms in this district were dissipated when the company ceased to exist.

As the result of all the recent work on the subject, we stand now on much firmer ground when we assert that tuberculous cow's milk is instrumental in causing the infection of children with tubercle. But we are no more able than ever we were to affirm that the majority of infections in children are of bovine origin. It does, however, appear not improbable that bovine tuberculosis is a never-ceasing fountain of energy from which the diminishing intensity of human tuberculosis is recruited. It thus becomes a matter of the greatest importance how we are to attack the problem of averting the occurrence of infection from tuberculous milk. Without entering into detail it may be stated generally that, as a result of the administration of the model milk clauses in Manchester, a great diminution has occurred in the amount of tuberculous milk sent into the city, while the virulence of infection of such milk has been much reduced in intensity. In addition, largely owing to the skilful use made of his opportunities by the veterinary surgeon, Mr. Brittlebank, an immense improvement has occurred as regards cleanliness. But it is evident that only a certain measure of control can be attained by these means, and that complete freedom from tuberculous infection involves efforts far greater and measures more radical than any yet taken. Professor Delépine, who has taken a large share in all the movements mentioned, arrived early at the conclusion that nothing short of complete eradication, with application of the tuberculin test, would suffice to remove bovine infection, and he formulated a scheme under which one area was to be declared after another, the animals within each successive area being tested and reacting animals eliminated. He has recently been able to apply his views to a particular herd, and arrived at the conclusion that elimination of tuberculosis might be effected in a milking herd without loss if the animals were not kept to an advanced age. Practically this is the policy pursued by cowkeepers having farms within the city of Manchester, although they do not apply the tuberculin test; but, of course, they do not produce calves.

We must ask ourselves the following questions:

1. Can we attain to substantial freedom from tuberculous infection without proceeding to the eradication of tuberculosis?

Complete freedom from tuberculous milk is only attained by the purchase of young selected animals, which are kept in milk for a year and then replaced. Supposing that, with Ostertag, we adopt the policy of removing from herds animals affected with tuberculosis so soon as their disease becomes plainly manifest to the clinician. If we confined ourselves to pulmonary disease we should find ourselves baffled by abdominal, renal, and uterine tuberculosis, and the clinician is driven to examinations of the various excretions for tubercle bacilli. These examinations are imperfect, and the occurrence of tubercle bacilli is uncertain and irregular. He is thrust back more and more on the tuberculin test. When he has availed himself of this aid, is he prepared to trust to his sagacity in keeping down tuberculous infection of the milk, and to recommend the consumption of milk derived from cows which he knows to be tuberculous? Segregation then becomes necessary. Such appears to be the process through which Ostertag's scheme for controlling tuberculosis in North Germany has been passing. The measure of success which it has attained has largely depended on the excellent cowsheds which have been erected. A cowshed is in truth a common lodging house for cattle, with circumstances that render it more dangerous than the worst of our common lodging houses, where tuberculosis reveals itself as a rapidly-spreading disease, which can only be held at bay by the most rigorous exclusion and constant vigilance of cleanliness.

The following experience, recorded by Bang (Denmark) in his communication to the International Veterinary Congress held at Budapest in 1905, is both valuable and striking in more respects than one:

"On a large farm, the stock of which contained tuberculous beasts, although to all appearance not in large numbers nor severely affected, yearly tests with tuberculin were made from 1891 onwards on all the young animals. The small number reacting were slaughtered, and the sound ones were kept isolated till they had calved, after which they were placed at one end of the common, large, well-ventilated cowshed. The new contingent was thus, year by year, absolutely healthy. Nevertheless, when in 1908 I got the owner to submit the whole of the herd, recruited in this manner, to the tuberculin test, 286 reacted and only 29 were healthy. The matter was then properly dealt with and the disease eliminated."

This experience shows the difficulty of arresting the spread of tuberculosis by any means short of absolute eradication.

It might, however, be supposed that, without eradicating tuberculosis from the herd, or even preventing its spread, it would be possible to keep down the occurrence of tuberculosis of the udder, that is to say, of tuberculous milk, to trifling dimensions by removing plainly tuberculosed animals.

On this point we are able to throw some light from our own experience. The following table, prepared by our veterinary surgeon, Mr. Brittlebank, appears conclusively to disprove the reasonableness of such an expectation.

Number of Cows Suffering from Tuberculosis of the Udder in Each Year and the Number of these which were Diagnosable Clinically as Suffering from Tuberculous Lesions other than Tuberculosis of the Udder.

	1901.	1902.	1903.	1904.	1905.	1906.	1907.	Total.
Number of cows proved to be suffering from tuberculosis of the udder	14	31	28	16	31	30	28	178
Number of those in which tuberculosis was recognizable clinically without consideration of the udder condition.	9	20	12	6	6	7	5	65
Number in which tuberculosis was not recognizable clinically.	5	11	16	10	25	23	23	113

In face of these figures it appears impossible to maintain that the mere removal of animals diagnosed clinically as suffering from tuberculosis will suffice materially to reduce the quantity of tuberculous milk coming into the market.

2. What difficulties stand in the way of the eradication of tuberculosis, and is such a measure practicable?

It must be admitted that the difficulties are numerous and formidable. Taking milch cows alone: If we assume that some 30 per cent. are tuberculous, it is evident that any attempt to withdraw such a number suddenly from the herds of the country would create a milk famine, and that those who would suffer most would be the consumers. Then the housing arrangements are not such as to render a measure of this kind of any practical utility.

The provision of suitable sanitary (sufficient and easily cleaned) cowsheds is an absolute necessity of any such effort. Again, it is doubtful whether our farmers are prepared to give the constant care and labour necessary to carry out such an undertaking. Yet the whole success or failure of this measure rests with the farmers. No less vital is the equipment of the veterinary surgeons, to whom the conduct and supervision of these operations would be entrusted. It is manifest that the entire elimination of tuberculosis is a colossal task which must involve a large expenditure on buildings and in administration, and which, both for reasons of education and for economical reasons, must be spread over a considerable period of time.

3. Do the advantages of complete eradication outweigh the disadvantages?

What are the advantages? In the first place, a great source of loss to the agricultural interests of the country would be obliterated, but at a considerable cost in new buildings, expense in veterinary service, cost of tuberculin, and the initial cost to the farmer in the renovation of his herds. The farmer should of course pay his share, but the larger share of the expenses should be cheerfully borne by the country generally. The expenses of the veterinary service and the provision of tuberculin should come out of imperial funds, and the necessary tax should be borne by the whole of the community.

The second advantage of the complete eradication of tuberculosis would be that the dairying industry would be revolutionized; and the third advantage would be that a powerful impetus would be given to the consumption of milk as an article of food. The dairying industry would certainly increase greatly, and a larger population would settle on the land—a consummation desired by every well-wisher of his country. Our meat, also, which has been losing ground in the market, would obtain enhanced prices. Above all, many fine children would be saved to the nation; while it is even possible that a formidable blow would be struck at the permanence of tuberculosis in man.

The disadvantages may be summed up briefly as the difficulty in providing workable machinery. It seems evident that complete success in this enterprise is not to obtained by voluntary action, and that it can only be secured by the joint forces of good government and reasonable assistance.

4. What are the measures required for the eradication of tuberculosis?

Last year, at the instance of Dr. Robertson, of Birmingham, a meeting of the authorities of large towns interested in this question was held in Manchester, at which a resolution was carried in favour of a thorough-going policy. Afterwards a deputation was received by Mr. Burns and Lord Carrington, at which the conclusions arrived at were placed before these Ministers. Later on, the subject was brought before a well-attended meeting of the Lancashire Veterinary Association on April 2nd, 1908, and the members were unanimously in favour of the same view. There is, therefore, a growing force of educated opinion in favour of a radical policy. To carry it into effect, however, we require:

(*a*) A staff of independent and highly trained veterinary surgeons, who have specially studied the subject of bovine tuberculosis.

(*b*) Housing provision must be made. It is certain that unless means be found to interpose a sufficient distance or barrier between the reacting and non-reacting animals and all the services pertaining to them, the disease is liable to crop up in the sound herd and complete eradication to take longer time. It is to be desired, though not absolutely essential, that at the inception of this policy the central government should establish a number of farms at which the methods might be demonstrated and instruction given. It would answer equally well if this scheme was carried out through the county councils. Due regard would require to be had to the keeping of pigs near the buildings intended for the housing of sound stock, and to the storage of manure, so as absolutely to confine any infected manure in a restricted space. The veterinary inspectors should be appointed by the county councils, subject to the approval of the Local Government Board. The medical officer of health should be in constant touch with what is being done on the farms, and this end can only be secured by some official nexus. The veterinary surgeon would only in a sense be the subordinate of the medical officer of health. He would deal practically with all questions relating to the housing of cattle, the state of the dairies, water supply, etc.; but it would be essential for his own guidance that the medical officer of health should have cognizance of these matters. He cannot trace the relations of bovine to human tuberculosis unless he is able to follow closely the changes in progress. The simplest solution of the difficulties in regard to the central government is to make the medical and veterinary service one and indivisible. The veterinary inspectors should be paid out of imperial funds, as their services would be rendered both to the stock raiser and to the consumers of milk and meat.

In order to improve the housing of cattle a uniform code of regulations would be framed and made applicable to all districts, the authorities of which would be required to survey the homesteads within their boundaries, to keep a register, and to classify the homesteads into three classes. Every milk dealer entering into a contract for the purchase of milk from a farmer would be entitled to receive from the sanitary authority a certificate showing the class of farm from which his milk was obtained, which certificate he should be obliged by law to produce on demand to the accredited officer of the sanitary district in which his milk was being sold. It would then be competent for the sanitary authority of the latter district to require compliance with the regulations before admitting the milk into their district. In this way pressure would be brought to bear on refractory authorities, without interfering more than was necessary with existing machinery.

If we could have our choice of the methods to be adopted we should begin by selecting farmers of known steadfastness and probity, put their farmsteads into an efficient condition, instruct them carefully in the precautions to be taken and the errors to be avoided, and then start them off with a clean stock on some adequate guarantee that they would carry out the measures prescribed.

Having thus established in a variety of centres the nuclei of healthy stocks we should add to the number of sound herds year by year. No herds would be declared free of infection which had not been purged under official supervision. Government aid would be given only to those farms scheduled for testing and grazing by the official veterinary inspector.

Precise instructions would be laid down, and the farmer would be bound to continue to carry them out after the first purgation had been completed. But in return the entire cost of the operation would be borne, in the first two or three years, by the Imperial Treasury, the official veterinary surgeon valuing the animals to be tested before the commencement of operations.

As the number of animals free from tuberculosis increased, a large number of farms would each year be brought under control, until at the end of, say, twenty years, there would be no tuberculous stock left.

Certain points require attention. Each animal tested would be registered, and marked in such a way as to distinguish those reacting from those not reacting.

As the number of farms dealt with each year increased rapidly, local veterinary surgeons would acquire the necessary expertness in carrying out the test, and their services might be utilized by the administration. Tuberculin should be issued only by Government, and the sale or use of other tuberculin should be forbidden. The use of Government marks for tests not conducted under official supervision should be forbidden. In short, the proposal is that eradication should be compulsory, and spread over a number of years, and should be controlled and carried out under the official supervision of veterinary officers specially trained for the work, and specially instructed in all the attendant precautions required.

With regard to cowsheds, there can be no doubt that the provision of suitable housing for cows would do something to check the spread of bovine tuberculosis. There are many cowsheds so defective that they must contribute to the spread of the disease. There is, however, an intermediate class in which, if due provision is made for ventilation and cleanliness, it would be possible to rest content with alterations short of the full requirements, until the period arrived at which eradication of tuberculosis was to be effected.

It may be found possible to mitigate in various ways the expense contemplated in these proceedings; for example, it might be possible to make provision in open sheds for the housing of reacting animals not severely affected, at a distance from the homestead.

The proposals put forward may now be summarized:

1. The country to lend money at a low rate of interest to landowners, on sufficient security, to enable them to carry out necessary works of construction or reconstruction.

2. The country as a whole to provide the veterinary staff required and the tuberculin, as well as to make good losses involved in the first instance in eliminating tuberculosis from herds.

3. The maintenance of non-tuberculous herds to be compulsory, and the cost of any renewal of stock to fall on the farmer.

4. In return for their contribution to the agricultural interest, consuming communities should have rights of control over the production of milk which they consume.

5. Milk dealers in entering into contracts should be obliged to satisfy themselves that their milk is produced under reasonably healthy conditions.

There is no power stronger than education. Urban communities should be educated to demand non-tuberculous milk by the diffusion of pamphlets and by lectures. Farmers should be educated by frequent discussions, lectures, and pamphlets.

The objects to be attained are of the first order, namely, to prevent infection, to extend the consumption of milk, and to render the stock-raising and dairy industries more prosperous. We have considered the difficulties. But are they less under any other plan?

In my opinion no proposal which has not for its declared aim the extirpation of bovine tuberculosis contains that element of ultimate profit which justifies large present sacrifices. It may be that other ways of reaching this goal will be opened out. It may also be that the Order recently issued tends towards this end. But a clear declaration of purpose is eminently to be desired.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A CASE OF VIPER BITE.

APROPOS of the accident under the above heading to Dr. Peck, perhaps an account of a similar case which occurred in the New Forest during the recent Territorial training may be of interest. Whilst out on duty on August 5th with the 7th Battalion Royal Warwickshire Regiment—on a route march, through a very rough piece of country—an officer hurried up to me saying that he had been bitten by a grass snake, on the hands; knowing the same to be harmless I did not apply any local treatment, but, as he was rather exhausted through running under a hot sun, I directed him to lie down in the shade. After a short time, he said he felt much better, and I proceeded on to the head of the column. About ten minutes afterwards word was passed along for me that Lieut. X., who had been bitten, was very ill, and I found this was so. He was apparently suffering from severe collapse, cyanosed lips, blanched face, pulse hardly to be felt at the wrist. I gave him repeated doses of aromatic spirits of ammonia ʒj to Oj of water, which caused vomiting, and $\frac{1}{60}$ grain strychnine hypodermically; his condition, however, showed little sign of improvement, and seemed very alarming. He complained of extreme cold, although the day was exceedingly hot and sultry; the left hand and forearm being now noticed to be swelling rather rapidly, the parts looking very congested. He was carried to the roadside, about 200 yards, and the owner of a passing motor-car conveyed him to the camp, five miles away; at this time, about one hour after the bite, the patient was rather better, although the arm was still continuing to swell. On arrival in camp his left hand, forearm and arm, were found to be affected with a rapidly increasing brawny induration, which, by the next day, had extended to the side of the thorax. By the end of the second day the limb at the middle of the humerus, was, roughly speaking, of the size of a man's thigh, severe burning pain was complained of on the least movement, and great tenderness on being touched. On the third day the condition was a little better, and from this gradually improved, so that he was able to leave his bed at the end of the week. As the induration and oedema subsided there was an unusual discoloration of a blueyred colour all over the arm.

The bite, of course, was inflicted by the adder or viper (*Pelias berus*) which is very common in the New Forest, and several were killed by men of our battalion. I heard, locally, that an adder bite would kill a dog, and frequently did so; the hot weather doubtless increased the severity of the action of the poison as would appear to be generally the case with adder bites. The second bite on the officer's right hand, though apparently just as deep as the one on the left, occasioned very little trouble, and there was only swelling in the neighbourhood of the bite, and none on the forearm, the poison being all expended in the first wound.

The bite of the adder is inflicted by two hollow teeth in the upper jaw—that is, a single long curved fang on each side of the maxillary bone, which is so attached to the bone next behind it by muscles that it can be rotated backwards when the reptile does not require its poison fangs, and the fang itself be concealed in the gum with its point turned in the direction of the throat. The poison fang is formed on the same principle as other teeth, with this exception, that along its outer or convex edge it is provided with a groove, extending from the base towards the apex, and open at both ends; this groove provides a secure channel for the duct which conveys the poison from the gland which secretes it. This gland is situated on each side of the head, and consists of a number of elongated narrow lobes, whose secretion flows into a common duct, which conveys it to the base of the poison fang. This description is based upon that of Professor Owen, and it is easy to understand from the situation and action of the fangs that a snake seems to "hang on," as the officer whose case is quoted above declared that the one did that inflicted his wound.

JOHN ORTON, M.D.,
Captain, R.A.M.C.T., Attached, 7th Battalion, Royal Warwickshire Regiment.

Coventry.

A CASE OF CHRONIC COPPER POISONING.

As cases of copper poisoning are rare, even among workers in the metal or its salts, and the number of operatives engaged in the working of copper is only about 8,000 in the British Isles, I think the following case worth recording:

A. B., aged 20 years, has been engaged for two and a half years in the brush grinding department of a crucible works, in which department a great deal of dust is produced by the grinding of the brass. The patient states that at different times all the workers have suffered from the same symptoms in varying degrees.

With the exception of becoming somewhat thinner, he remained well until about three months before he came under my care, when loss of appetite and power, slight jaundice, and progressive emaciation set in. Tremor on the least excitement had been present for two months.

When seen he was flabby and emaciated, the conjunctiva and skin were slightly jaundiced, and a green line on the gums was present. He complained of vague abdominal pains, colicky in character, of dryness of the mouth and throat, and pain in the epigastrium after food. There was obstinate constipation, considerable straining at stool, frequent attacks of faintness, and marked shortness of breath on the least exertion. There was no tendency to wrist drop, nor was profuse perspiration present.

As the result of abstinence from work, general care, etc., his general condition has improved, and during the ensuing seven weeks there has been slight increase in weight, the jaundice subsiding, tremor disappearing, the abdominal pains being less frequent and less severe, he sleeps better, and his appetite is slowly returning. He is now going for a change to the country.

The case is evidently one of copper poisoning by the inhalation of brass dust.

The patient states that respirators, although provided, are not worn by the operatives, but otherwise he has taken precautions as regards washing before meals, etc.

Battersea, S.W. E. HUGH ROBERTS M.R.C.S., D.P.H.

Reviews.

OSLER AND McCRAE'S SYSTEM OF MEDICINE.

THE sixth volume of OSLER and McCRAE'S *System of Medicine*[1] is especially useful as it deals with a number of diseases of obscure causation and of relative rarity, concerning which the practitioner often feels his knowledge to be limited and likes to have at his elbow some standard account upon which he can rely to give him the information of which he stands in need. The contributors to this volume are chiefly American; in fact, of the thirteen, Dr. Archibald Garrod, Dr. Osler and Dr. John McCrae of Montreal are the only British subjects, and have an even more insignificant portion of the subjects allotted to them, only 126 out of 766 pages of text.

The first part of the volume is devoted to diseases of the kidney, and opens with an excellent introduction by Dr. John McCrae. Dr. Garrod writes on anomalies of urinary excretion and on uraemia, and has incorporated in these chapters much of the information given in his Croonian lectures. The chapters on Bright's disease are by James Herrick, Professor of Medicine in the Rush Medical College, Chicago. He does not seem to have made up his mind whether lardaceous disease should or should not be described as a form of nephritis, although it is true, as Lecorché said, that in lardaceous disease of the kidney, if there is no nephritis there is no albuminuria; the waxy kidney as described by Grainger Stewart and Dickinson is chronic nephritis with secondary lardaceous degeneration. Dr. T. R. Brown, of Johns Hopkins University has written on the bacteriology and pyogenic affections of the kidney. This chapter includes tuberculosis, and is a good study of that subject; he notes a point, often overlooked, that haematuria may be the earliest sign of renal tuberculosis. Tumours of the kidney, stone, genito-urinary diagnosis, and diseases of the prostate are dealt with by Dr. H. H. Young, also of Johns Hopkins University. He is a strong advocate of prostatectomy, quoting a series of 128 consecutive cases of the perineal operation without a death; he points out that there is a better chance of dealing successfully with cancer of the prostate if excision is recognized as the proper treatment for prostatic retention and time is not wasted with catheters.

The chapters on diseases of the ductless glands, including the adrenals, the thyroid, and the pituitary body, are written by Professor Dock of New Orleans. He notes the interesting fact that the adrenal glands of negroes are larger than those of the Caucasian races. The section on the parathyroid glands contains a great deal of much-needed information of value to teachers as well as students. In the article on Graves's disease there is a suggestion of the possible origin of the affection in an infective thyroiditis. In discussing the causation of endemic goitre, Professor Dock lays stress on the value of boiling the drinking water as a preventive, and argues that this gives support to the theory of infection, but when the article was written he was apparently not aware of the observations of Captain McCarrison (see JOURNAL, 1909, vol. i, p. 434), who has shown that the solid matter removable from the drinking water by filtration is capable of producing enlargement of the thyroid gland in thirteen to fifteen days, but is rendered innocuous by boiling. We note that Professor Dock uses what is probably the correct spelling of "miosis," signifying contraction of the pupil, although it is usually spelt with a "y." In the treatment of Graves's disease he commends partial excision or tying two or three of the thyroid arteries, and thinks the operation should not be postponed too long, but should be undertaken if the patient is not distinctly improved by complete rest, if the tachycardia is severe, or if symptoms of pressure on the trachea come on. Mayo is said to decline to operate if the pulse-rate is over 130 or is irregular, or if anaemia or oedema are present. Professor Dock employs at times a somewhat polyglot vocabulary; for example, he writes "anlage" to express the stock of embryonic tissue from which an organ is developed (p. 385), and "recidive" for relapse (p. 455). On page 456 myxoedema is said to be in some parts of England "so common as to be spoken of as endemic," a statement which is misleading.

The chapter on Hodgkin's disease is written by Dr. Longcope of Philadelphia, who thinks that the cases which have been thought to be transitions to lymphatic leukaemia were throughout examples of the latter, with absence of lymphocytes from the blood. The histology of the lymphatic glands is said to afford an absolute criterion of Hodgkin's disease, but when we turn to the paragraphs on histology we are not sure that we find this as plainly set out as might be desired; we read that the "general character of the growth, the thickened reticular mesh enclosing lymphoid cells, epithelioid cells, plasma cells, giant cells, and eosinophilic leucocytes forms a picture so characteristic that according to recent writers it cannot be mistaken for any other condition." He adds that the eosinophiles have been emphasized as particularly characteristic. With regard to the treatment of Hodgkin's disease, it is said that the immediate results of *x* rays are almost always satisfactory, but the growths return when the treatment is discontinued, tumours of soft type disappearing more readily than the harder kind; 24.1 per cent. of the cases have survived three to four years, but instances of *x*-ray dermatitis have been common.

Dr. Thomas McCrae's chapter on arthritis deformans calls for special commendation, as it grapples boldly and thoroughly with a subject which at the present time has many difficulties, some of them perhaps insuperable. We do not think it right to speak of any of the included conditions as "infectious" arthritis, as "infectious" means transmissible; "infective" means caused by an infection or parasite, and this we believe is the sense he intends to convey. We believe him to be right in pronouncing strongly in favour of infection as the probable cause of all these forms of arthritis, and in rejecting the suggestion that any one of them depends upon true acute rheumatism. Under the heading of "Treatment" we are astonished to note that he omits Buxton, which has a deservedly high reputation for the treatment of these affections; nor does he mention Wildbad, where the treatment in many respects resembles that at Buxton, and is much thought of in Germany. He has also omitted Bier's hyperaemic method, which is very simple and has strong evidence in its favour. In the treatment of lumbago—dealt with under myalgia—nothing is said about the value of a belt or of local heat or of sleeping in blankets. Professor Dock writes on osteomalacia, and Professor McCarthy of Philadelphia on astasia-abasia, adiposis dolorosa, and myasthenia gravis. In the last he misspells the honoured name of Sir Samuel Wilks—a fault one would not have expected in a book nominally edited in England.

Professor Osler writes on Raynaud's disease, angioneurotic oedema, hereditary oedema, diffuse scleroderma and erythromelalgia, and with regard to these obscure diseases has put together a great deal of valuable information. The chapter on achondroplasia by Dr. Charles Emerson, late of Johns Hopkins Hospital, is a short monograph of considerable value, the author having studied the subject under Professor Pierre Marie at Bicêtre, but we protest against his use of the word "lues" as synonymous with syphilis. He also writes upon the hypertrophic osteoarthropathies. "This country" on page 710 obviously refers to the United States of America.

The concluding part of the volume is a chapter on the medical aspects of life insurance; it is written from the American standpoint, and fails to do justice to its subject as practised on this side of the Atlantic. On page 753 the author, Professor C. L. Greene, advocates making syphilis an absolute bar to life insurance, a course which we do not think would commend itself to medical experience here.

[1] The Oxford Medical Publications. *A System of Medicine.* Edited by William Osler, M.D., F.R.S., and Thomas McCrae, M.D., F.R.C.P. Vol. VI. Diseases of the Urinary System, Duct less Glands, Obscure Causation, Muscles, Vasomotor and Trophic Disorders, Life Insurance. London: Henry Frowde, and Hodder and Stoughton. 1909. (Roy. 8vo. pp. 809. 30s.)

THE ETIOLOGY OF CANCER.

THE eighth report of the Cancer Research Laboratories, published in the *Archives of the Middlesex Hospital*,[2] contains some sixteen excellent papers, their authors being either the Director, Dr. Lazarus-Barlow, or one or other of

[2] *Archives of the Middlesex Hospital*, vol. xv. London: Macmillan and Co. 1909. (Cr. 8vo, pp. 204.)

his five assistants and the half-dozen research scholars who work under his supervision. A considerable proportion of the papers deal with subjects whose connexion with cancer investigation would seem at first sight at any rate to be very slight. Instances in point are discussions on the influence of atomic weight and valency on the radio activity of uranium and thorium compounds by Dr. Lazarus-Barlow and Dr. A. H. Colwell, as also the paper by Dr. H. MacCormac dealing with the power of certain micro-organisms to affect a photographic plate in the dark. Midway between these and papers of more direct interest in this connexion may be placed another paper by Dr. Lazarus-Barlow showing the results of an investigation of the influence of carcinomatous and non-carcinomatous tissues upon the electroscopic leak. The upshot of the experiments seems very inconclusive, but so far as it goes would appear to indicate that carcinomatous materials tends to accelerate the leak as compared with innocent growths and normal tissues. This inquiry constitutes a part of a research into the question of whether there is any evidence of a connexion between radio-activity and the carcinomatous process. On this point it may be noted that in his Croonian lectures in June—which may be regarded as a summary of all the investigations in this report—Dr. Lazarus-Barlow seems disposed to regard such causal relation as existent, though not at present fully demonstrable. Among the other papers are statistical studies of malignant disease of the cervix uteri, the thyroid gland, the ovary and the mammae by Dr. H. MacCormac, Miss Helen Chambers, M.D., and Drs. Brydon Glendenning and H. Beckton respectively. Basing his views on the study of the records of the Middlesex Hospital from 1904 to 1908, Dr. MacCormac concludes that malignant disease of the cervix uteri is a disease not of the ageing individual, but of the ageing uterus, his other findings being closely comparable with those of Andriezen and Leitch. Among Miss Chambers's conclusions the most important perhaps is to the effect that of all thyroid new growths only those can be considered malignant which ultimately extend beyond the capsule of the gland and infiltrate the surrounding tissue, and that though cases are often protracted the prognosis is always bad. Dr. H. Beckton regards his very careful study of the records of mammary cancer at the Middlesex Hospital from 1904 to 1908 as in general agreement with those set forth in the fifth volume of the same *Archives* which dealt with 1,976 cases occurring between the years 1747 and 1903. Finally, it may be mentioned that Dr. H. A. Colwell in his paper on the power of the peptone-splitting enzyme, erepsin, as procured from malignant and normal tissues respectively, concludes that the ereptic value of malignant tissue is practically identical with that of tissues from persons suffering from any serious chronic disease, these in their turn tending to be lower than normal.

A Theory Regarding the Origin of Cancer is cleverly built up, but the author, Mr. C. E. GREEN, of Edinburgh, has chosen rather slender materials for its foundation.[3] The second part, which is the best portion of the book, describes some ideas which are decidedly original. The theory is that because cancer is common in certain trades, and because it appears to be more prevalent in certain districts, the disease is parasitic in origin. Further, because tumours are produced in some plants by *Plasmodiophora brassicae*, therefore cancer may be caused by a like fungus. Then comes the original suggestion. Since workers in certain trades, such as that of chimney sweep, and others who come in contact with products which contain sulphuric acid, are prone to cancer, and since sulphuric acid favours the growth of the fungus, the author deduces that it is the sulphuric acid in the products which is the cause of the trade incidence of the disease. He goes on to describe how the place incidence may be due to smoky chimneys, and to an atmosphere which contains sulphuric acid. The presence of sulphuric acid is also traced in the materials used in other occupations which seem to favour the disease. This last point is the most interesting part of the book, and would be more valuable if more details were given. We think, however, that the author goes too far when he states that sulphuric acid diminishes the oxygen in the tissues, and that this accelerates the growth of the fungus. Unfortunately, the theory is based on two principles which are not beyond dispute, while the other well-known facts at our disposal are not taken into account. There is little doubt that workers in certain coal-tar compounds do develop cancer frequently, but this is hardly sufficient to base a theory on. The place-incidence—the other principle on which the theory is based—may fall to the ground in view of the fallacy due to "the error of random sampling"; a point which Mr. Green never mentions. The age incidence of the disease is hardly touched upon, while the cytology of cancer, and its association with irritation are omitted altogether. Nevertheless, the originality of the theory will repay the short time required for the perusal of the book, which is clearly written, and which must have entailed considerable thought and observation on the part of the author.

[3] *A Theory Regarding the Origin of Cancer.* By C. E Green. Second edition. Edinburgh and London: William Green and Sons. 1909. (Crown 8vo, pp. 52.)

PATHOLOGY.

THE two large and copiously illustrated volumes on pathological anatomy edited by Dr. ASCHOFF[4] are the joint production of many well-known German pathologists. There are both advantages and disadvantages in putting together a book of this sort by the method of collaboration. It is difficult to secure from the individual writers the requisite subordination of the parts to the whole; their contributions do not always fit together very well, and though the editor may cut out obvious inconsistencies he is less able to prevent overlapping, and it is impossible for him to secure the unity of thought and purpose which stamps the book written by one master-mind. In vol. i we have a long article by Dr. Askanazy on "external causes of disease," amongst which the pathogenic bacteria naturally take an important place; and in dealing with those diseases produced by external agents, such as syphilis, tuberculosis, leprosy, and actinomycosis, the author gives a tolerably full account of the histology of the lesions associated with each of them. Then about two hundred pages further on we get the histology of these same diseases described for us over again by Dr. Lubarsch, who introduces them into his chapter on inflammation under the title of "specific inflammations or infective granulomata." This repetition is undesirable. On the other hand, the advantage of apportioning the book amongst various writers is that each author is given the opportunity of writing about subjects in which he is especially interested, and as no one man can be equally good in all branches of pathological anatomy, this division of labour tends to keep up the whole of the book to a high standard of excellence. The three articles written by the editor on the heart, the urinary apparatus, and the female sexual organs are excellent examples of the successful treatment of special subjects. In his general arrangement of the book, perhaps the editor has made the mistake of trying to include too much. The sections on bacteriology might have been omitted with advantage; as the student has plenty of good bacteriological textbooks to choose from, there is no need to interpolate scraps of this subject into a work on pathological anatomy. Indeed, the whole of "General Etiology," which forms the first part of vol. i, might have been cut out without much loss. The articles in this volume which are particularly good are those on malformations, by Dr. Schwalbe; inflammation, by Dr. Lubarsch; and pathological growth and tumour formation, by Dr. Borst. The eight pages on immunity, by Dr. Kretz, seem out of place, since this subject is only indirectly related to pathological anatomy. In vol. ii, which is concerned with "special pathological anatomy," in addition to the three articles by the editor already mentioned, special praise must be given also to Dr. Benda's chapter on the pathology of the vessels, to Dr. Schridde's article on the blood-forming organs, and to the treatment by Dr. Schmidt of the skeletal and muscular systems. The pathology of the blood, if it ought to have been included at all, deserved fuller treatment than

[4] *Pathologische Anatomie.* Herausgegeben von L. Aschoff. Erster Band: *Allgemeine Aetiologie. Allgemeine pathologische Anatomie.* Zweiter Band: *Spezielle pathologische Anatomie.* Jena: Gustav Fischer. 1909. (Sup. roy. 8vo, vol. i, pp. 642, 364 illustrations: vol. ii, pp. 819, 1 lithographic plate and 552 illustrations. M. 22.50.)

the ten pages assigned to it by Dr. Naegeli; this important subject is more adequately treated in the average textbook of medical or clinical pathology.

Dr. A. W. HEWLETT, of San Francisco, has brought out a second edition of his translation of Krehl's *Principles of Clinical Pathology*,[5] a title which he has substituted for the somewhat incongruous terms *Pathological Physiology*, under which the German original is known. The book is simply an ordinary student's textbook on general pathology, and should have been called "general" rather than "clinical," since the latter title is usually assigned to works on the routine technique of the clinical laboratory. As we remarked in reviewing the first English edition (BRITISH MEDICAL JOURNAL, vol. i, 1906, p. 148), the merit of Dr. Krehl's way of presenting his subject is that he treats disease as a perversion of physiological function, and teaches the student that in order to understand morbid processes he must go back to the principles of physiology. In a brief introductory note which he has written for the book, Professor Osler emphasizes, in terms with which we cordially agree, the importance of works such as Dr. Krehl's in filling up the gap between empirical and scientific medicine. But in justice to British pathologists we must point out that this is by no means a new departure, and that our own country has always led the way in teaching the applications of physiology to medicine. It is impossible to read current British medical literature without appreciating the profound influence which distinguished British physiologists have exerted upon it, and the same impress is borne by the many excellent textbooks on general pathology which our own countrymen have written. Take, as one example out of many, Dr. Lazarus-Barlow's well-known book on *General or Experimental Pathology* and compare it with Dr. Krehl's work. It will be seen that both writers know their physiology well, and make excellent application of it in their chapters on derangements of the heart and vascular systems, nutrition, fever, respiration, and other matters. But for general grasp of his subject the English writer is certainly not a whit inferior to the German, and for all purposes of the medical student we regard the textbook of the former as decidedly the better of the two.

ARTHRITIS DEFORMANS.

SUFFERERS from chronic joint diseases often find their way either to Bath or to Buxton, and the medical officers of the respective mineral water hospitals have unique opportunities of studying the various phases of arthritis. Dr. LLEWELLYN JONES, of Bath, has written a treatise on the subject,[6] which embodies a very clear and definite account of the chief work that has been done in the past, together with the results of his own extensive experience. Admirably printed and illustrated, and furnished with very complete bibliographies in each section, the work represents the sum of modern knowledge on the subject. But the sum of knowledge is still far from complete. That osteo-arthritis and rheumatoid arthritis are distinct affections there can be no doubt, as the evidence connecting the two conditions is altogether inconclusive. The means by which they are respectively started are very varied. All kinds of infections and many kinds of micro-organisms have been recognized as causative of apparently similar lesions, but the peculiarity of osteophytic outgrowths occurs only to a moderate extent in the rheumatoid variety, while it is the characteristic mark of osteo-arthritis. This distinction was pointed out in the first instance by the late Mr. William Adams, and still forms the main dividing line. The author describes the pathogeny of both conditions as a series of "guesses and gaps"; but he rightly lays especial stress on the early recognition and treatment of premonitory symptoms of joint troubles. Spondylitis deformans and arthritis deformans in children are fully described and discussed, and the book as a whole may be commended as presenting all that ancient observation and modern research have achieved towards the elucidation of a problem that remains as yet unsolved.

[5] *The Principles of Clinical Pathology.* By Dr. Ludolf Krehl. Translated by Albion Walter Hewlett, M.D. Second edition. London: J. B. Lippincott Co. 1909. (Royal 8vo, pp. 520. 21s.)

[6] *Arthritis Deformans.* By R. Llewellyn Jones, M.B.Lond., of Bath. Bristol: John Wright and Sons, Limited; and London: Simpkin, Marshall and Co. (Roy. 8vo, pp. 365; 38 full-page plates. 9s. 6d.)

POPULAR HYGIENE.

DR. BURNET'S *Campaign against Microbes*, translated by Mr. AUSTEN,[7] is written in a popular and vivacious style which is likely to be found attractive by the average lay reader for whom the book is apparently intended. The author has a happy gift of explaining scientific matters with lucidity, and is also to be commended for his endeavours to enforce useful lessons in hygiene. But in writing a popular account of "microbes" we think he would have put his talents to better service if he had confined himself to matters about which there can be no scientific dispute. The first fifty-two pages of the book are on cancer, and develop the view that cancer is an infectious disease caused by a parasite at present unknown. The well-known arguments in favour of this view are put forward with great plausibility, but as they have failed to convince many leading pathologists it seems premature to ask the general public to accept them. After cancer come tuberculosis, tetanus, and sleeping sickness, and all are discussed in an interesting manner. The chapter on "enteritis and intestinal microbes," which is an ardent plea for the efficacy of the Bulgarian bacillus, is most entertaining. "We weed our gardens and vineyards," urges Dr. Burnet, "and clear our trees from caterpillars; why not replace the noxious microbes in our bodies by others which are beneficial?" The last chapter, the best in the book, is an historical account of Jenner's work on vaccination.

The fourteen addresses on epidemics, which have been published by the Central Committee for the Advancement of Medical Knowledge in Prussia, under the editorship of Dr. Kutner, have been prepared by various well-known German doctors and pathologists.[8] Dr. Kirchner gives a brief historical and statistical account of the ravages which have been caused by epidemics, their cost in life and money, and the hygienic measures which have been employed to combat them. Modern theories of immunity and serum therapy are outlined by Dr. Wassermann, and the treatment of this subject could not have been placed in better hands, but the writer is disappointingly brief, and in the fifteen pages which his article occupies he does not succeed in conveying more than a vague and fragmentary impression of what immunity means. One of the best articles in the volume is on the etiology and prophylaxis of dysentery, and is written by Dr. Kruse, who traces succinctly and in popular style the advance of knowledge of the amoebic and bacillary forms of this disease. Dr. Kolle gives a good account of the bacteriological methods of diagnosing plague and cholera; and the article on tropical diseases, by Dr. Nocht, may also be recommended. The volume as a whole may serve a useful purpose in the direction of popularizing knowledge about the recognition, prophylaxis, and treatment of epidemic diseases.

NOTES ON BOOKS.

THE sixth volume of *The Ophthalmic Year Book*[9] has now appeared, and is brought out under the joint editorship of Dr. Edward Jackson, of Denver, and Drs. de Schweinitz and Schneideman of Philadelphia. The literature dealing with ophthalmology is now so extensive that it is impossible for any one to read it all, and a book like this is of the utmost value. From it can be seen at a glance a list of all the recent papers, and short abstracts of most of them, which at the end of this book upwards of 70 pages are devoted to a list, arranged alphabetically under the head of authors, of the papers of any note which have been published during the past year. It should find a place in the library of all workers on ophthalmology, who owe a debt of gratitude to the authors for placing such a useful and convenient book of reference at their disposal.

[7] *The Campaign against Microbes.* By Etienne Burnet, M.D. Translated from the French by E. E. Austen, F.Z.S. London: J. Bale, Sons and Danielsson. 1909. (Med. 8vo, pp. 250. 5s.)

[8] *Volksseuchen: Vierzehn Vorträge.* Herausgegeben von Zentralkomitee für das ärtliche Fortbildungswesen in Preussen. Redigiert von Prof. Dr. R. Kutner. Jena: Gustav Fischer. 1909. (Medium 8vo, pp. 390; 74 illustrations. M.6.)

[9] *The Ophthalmic Year Book*, vol. VI. Containing a digest of the Literature of Ophthalmology with Index of Publications for the year 1908. By Edward Jackson, M.D., G. E. de Schweinitz, M.D., and Theodore B. Schneideman, M.D. Illustrated; 415 pages. Denver, Colorado: The Herrick Book and Stationery Company. 1909. (Med. 8vo, pp. 415.)

THE SIXTEENTH INTERNATIONAL CONGRESS OF MEDICINE.

BUDAPEST, AUGUST 29TH TO SEPTEMBER 4TH.

BUDAPEST at the end of August! The multitudinous charms of the Hungarian capital, the fascination of the Blue Danube, the pleasure of meeting old acquaintances and of forming new ones, cannot be disputed or belittled, but these enjoyable factors attending the International Medical Congress have to be discounted in the face of a sweltering heat—a heat which even the natives complain of, and from which there is no escape. The members of the Congress, numbering well over 5,000, had been flocking into the town since the middle of the week preceding the Congress, and it may be boldly stated that medicine was fully represented in this number.

International Associates of the Medical Press.

On Friday and Saturday (August 27th and 28th) the Meeting and Congress of the International Association of the Medical Press took place. A report of the proceedings will be published in a later issue of the JOURNAL. At the Congress representatives of any medical journal were admitted, and although the Hungarians naturally formed the largest contingent, other countries, including Austria, Belgium, Brazil, Canada, England, France, Germany, Italy, Russia, and Spain, were adequately represented. The peculiar position of Russia rendered it necessary that the press members should not appear as delegates but in their personal capacities, as at present no national association of the medical press may be formed. In the absence of Professor Posner, the President, who is unfortunately ill in Berlin, Dr. Dejace (Belgium) occupied the chair, and was ably supported by Dr. R. Blondel (Secretary) of Paris, Professor Lenhossék (President of the Hungarian Association), and others. The sessions on Saturday were limited to the members of the International Association, and, apart from the morning and afternoon meeting, a meeting of the Committee also took place. On Friday evening Professor Lenhossék entertained a large party of the medical press at a dinner held at the Hotel Hungaria. The dinner itself was excellent, the floral decorations most pleasing, and the good fellowship exhibited was most gratifying. In contrast to former entertainments given in honour of the Medical Press Congress, the speeches were brief and calm. Professor Lenhossék spoke as host, Dr. Lucas-Championnière spoke in the name of France, Professor Martin in the name of Germany, Dr. Dejace for Belgium, Mr. Adolphe Smith for England.

The Royal University Building.

Reception of Welcome.

On Saturday evening the Organizing Committee of the International Medical Congress held a reception of welcome at the Fine Arts Building in the Városliget (City Park). The following passage appeared in the *Neues Pester Journal* in connexion with this reception:

> The prelude of the Medical Congress which begins to-morrow was seen this evening in the fairylike illuminated apartments of the Fine Arts Building in the City Park. The participants were there given the opportunity of extending a hand of friendship before proceeding on the morrow to battle energetically for the public weal and for scientific progress. Most of the members of the Congress had brought their ladies with them, so that the earnestness attending the assembling of the men of science was modified by female grace.

In cold reality, however, the picture was somewhat different. The building consisted of two large rooms connected by a fairly narrow passage and supplemented by a number of side rooms of considerable size. The rooms themselves were practically unadorned, save for the entrance hall and the buffet, where two fine paintings by Benczur and Mésgáros and some floral decorations assisted in giving a festive colour to the scene. About 2,000 persons were present, but the overwhelming majority were males, not too much in earnest, not too wrapped up in the affairs of science—but mere human males who did not hesitate to push and struggle, to climb and crawl—to arrive at the refreshment tables. Sweat poured from the male brows on all sides, and linen became flaccid. Ices and cold drinks only made matters worse. The majority appeared in evening dress, while the members of the Naval and Military Section relieved the black and white monotony by their varied uniforms. And the ladies appeared and suffered just as much. The members began to move homewards (or cafewards) at an early hour, and by 11 nearly all had left. In the great crush it was difficult to find friends, and many left without having fulfilled the intended function of the evening, namely, to speak with those who live in other countries, and with whom the average medical mortal only comes in contact at international gatherings.

The Hungarian Ministry of Agriculture and Hungarian Wine.

Each member of the Congress received as a present from the Hungarian Ministry of Agriculture a case containing two small bottles of Tokay wine, together with a small booklet describing the manner in which this wine is produced, its origin, and the value as a therapeutic remedy which it is supposed to possess. The present was intended as a mark of hospitality, and, even though the distribution of it and the pamphlet were entrusted to the National Association of Hungarian Wine Growers, the fact that the matter was supported by the Ministry diminished the force of any suggestion of trade advertisement. A letter written in the name of the Anti-alcohol Association, and signed by the President (Sir Victor Horsley) and Secretary (Dr. Holitscher, of Pirtenhammer, near Karlsbad), was sent to the local press calling on the members to refuse to accept this present, and pointing out that the article dea ing with the therapeutic value

of the wine was written by the brother of the Director of the Wine Growers' Association. The letter stated in plain, blunt language that since alcohol can no longer claim a place in therapeutics, and since this present bore the impress of trade advertisement, it must be beneath the dignity of the medical profession to support this iniquitous traffic by accepting the bottles of wine. The *Pester Lloyd* published the letter in full, but expressed the opinion that the suggestion of the "English Abstainers" was unfortunate and discourteous. Other papers referred to the letter, but refrained from publishing it. The fact that the President of the Anti-alcohol Association is an Englishman seems to have led many to visit their disapproval on the English members of the Congress, though this feeling was not shared by the majority of the Hungarians and other medical men at Budapest, nearly all of whom, it is said, have accepted or will accept the offering.

THE INAUGURAL SESSION.

At 11 a.m. on Sunday, August 29th, some 5,000 persons assembled in the Municipal Buildings (Redoute) to attend the official inauguration of the Congress. The hall is an extremely fine one, built in the early Sixties in Romanesque - Moorish style, after designs by the architect Fesse. The huge chandeliers, shedding the light of seemingly hundreds of electric lamps, the walls magnificently adorned with their exquisite figures, the gilded galleries, and the richly decorated ceiling, at any time impress the eye; but the effect was enhanced a thousand-fold by the medley of guests, in uniforms and costumes of every possible kind and colour. There were military men and naval men in full trim from every quarter of the globe—scarlet, purple, blue, and black; men in national costumes, in furs, in the Doctor robes of the English universities; Ministers and diplomatic personages, with their breasts covered with Orders; ladies in large hats and flowing feathers, in costumes suggestive of the Paris, London, and Berlin "creators," and in simpler gowns and hats. The sight was a wonderful one, and its climax was reached when His Royal and Imperial Highness the Archduke Joseph and the leading officials of the Congress arrived, and, the whole assembly standing, the National Anthem was sung by a most excellent choir of male voices. Through sudden illness, the President of the Congress, Professor Kálmán Müller, was unfortunately prevented from being present, and his place was filled by the venerable Professor, Baron Korányi. The press arrangements were, as is not unusual in such circumstances, extremely faulty; and from the well-like corner in which some correspondents were placed, scarcely a word of the speeches could be heard. With considerable difficulty was it possible later to obtain copies of the speeches, and the members of the press felt themselves impelled to make a definite, albeit polite, protest against such arrangements, in the hope that it might be of use for future occasions.

Statue of Semmelweis, in the Ergebet-teren.

The Archduke, who spoke in French, greeted the Congress in the name of the King of Hungary, and enlarged on the scientific importance of the enormous gathering.

Following this short speech, Baron Korányi greeted the Congress as its President *pro tem.*, and explained the unfortunate, but unavoidable, absence of the actual President.

The next speaker was Count Albert Apponyi, Minister of Education of the Hungarian Government, and one of the finest orators in the country. In the most choice terms, spoken in excellent French, he skilfully avoided all questions of international policy, while he extended a warm welcome from the Government to the representatives of medicine of practically every civilized country.* After the Minister had skilfully refrained from the least reference of any misunderstanding or discord, but had collectively greeted all nations, the Lord Mayor of Budapest, Herr Calman de Fülepp, extended his hospitable hand in the name of the Municipality.

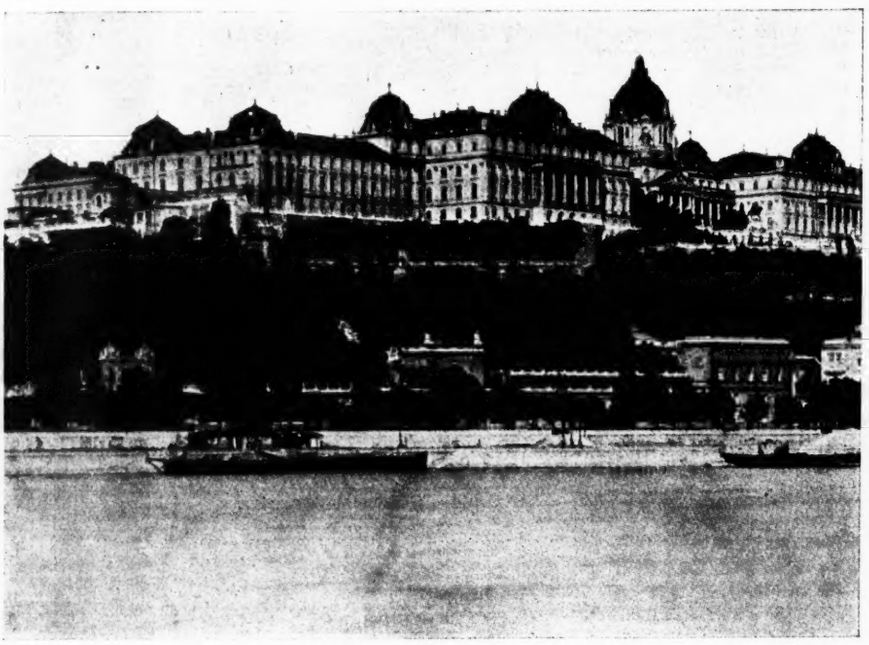
A very long discourse followed from the General Secretary of the Congress, Professor E. Gróss. First he spoke a few words in general welcome; next he read his report, in which he described the work of organization since its inception in 1906, including the work of the executive, financial, reception, and ladies' committees, and then reported that 3,432 members had already signed the roll, and that, as there were some 900 ladies accompanying the members, there was a grand total of over 4,300 persons; 274 delegates had been sent from various Governments, 149 from various universities, 327 from municipalities, and 7 from learned societies. Hungary counted 1,436 members, Germany came next with 288, France had 281, Austria followed with 235, and then came Russia 228, the United States of America 202, Italy 170, while the British Empire had 97 representatives. The growth of the International Congress was well exemplified by comparing these figures with those for the first Congress held forty years ago in Paris. The total was then 922. Professor Gróss believed that the reason why the members were increasing was that the aims of the Congress were exclusively scientific. He stated that the work of ploughing and of sowing was completed, and it remained to be seen what the harvest would be like. Having read his report he proceeded to read the speech which was to have been delivered by the President. In this speech thanks were extended to His Imperial and Royal Apostolic Majesty for his patronage and to the Archduke for his presence. The work before the meeting was dealt with in general terms, and the lines along which modern scientific medicine had been and was developing were sketched. Professor Gróss finally performed the dull task of reading out the names of the Honorary Presidents of the Congress.

By this time the scene had undergone a transformation. Many, finding that in the vast space no intelligible words

* The exception was that the profession in Roumania had deliberately boycotted the Congress for political reasons.

could be heard, had gradually elbowed their way towards the door, and had taken their departure. Others preferred to transform the hall into a conversation room, and the din of voices gradually but steadily increased until at last it must have been impossible to hear even a chance word of the speakers from the far end of the hall. The movement of persons, the movement of fans, and the sound of voices lent a new aspect to the assembly.

The speeches of the delegates of the various countries were for the most part short, the chief exceptions being Spain, Italy, and Turkey. It would be far wiser at such meetings if the delegates would follow the excellent example set by the delegate of Japan at the International Congress of Applied Chemistry held in London this summer, by making a speech of four words—"Messieurs, je vous remercie." Germany was represented by Geh. Med. Rat. Professor Uhthoff, the United States of America by Dr. Bevan, the Argentine Republic by Professor J. Mendez, Austria by Ritter von Haberler, Belgium by M. Victor Desguin, Bulgaria by M. Ivanoff, Chili by Professor Del Rio, Denmark by Professor Bloch, Spain by Professor Simonena Zabalym, France by Professor Landouzy, Great Britain by Dr. Pavy, Canada by Professor McPhedran, Greece by Professor Kalliontzis, Italy by Professor Baccelli, Japan by Professor Kitasato, Monaco by Dr. E. Caillaud, Norway by Professor Uchermann, Holland by Professor Wenckebach, Portugal by Professor de Oliveira, Russia by Professor O. de Ott, Servia by Professor Popovitch, Switzerland by Professor Bourget, Sweden by Professor Henschen, Turkey by Professor Pacha Zoéros, and Uruguay by Professor Maggiolo. The speech of the Bulgarian representative was much applauded.



The Royal Palace.

Professor Landouzy was given a hearty reception, and his speech was cordially applauded. Dr. Pavy also received, both before and after his speech, genuine and loud applause. When Professor Baccelli rose the air became tumultuous, and for several minutes it was impossible for him to proceed. The past-master of Latin oratory was in excellent form, and his dramatic delivery earned for him a renewed ovation at the end of his speech. Professor Kitasato also came in for a considerable burst of appreciation. Lastly, the "Young Turk"—Pacha Zoéros—was forced to bow and salute again and again before he was permitted to proceed with his speech. The majority of the speeches were delivered in French, while German, Latin, and English were resorted to only by a few.

Professor LUCAS-CHAMPIONNIÈRE, the newly-elected President of the International Medical Press Association, also spoke. A Hungarian hymn closed the proceedings.

GENERAL ARRANGEMENTS.

The building—a disused polytechnic school—appeared to meet the needs of the Congress. The preliminary arrangements had been undertaken with a studious foresight, and many of the mistakes of the past were rectified. The staff of assistants distributing the tickets, literature, etc., to the members was larger than usual, and the pigeon-holing of the members' passes, etc., was carried out in a manner which obviated confusion. Interpreters in sufficient numbers were present to help the helpless, and everybody officially connected with the organization fulfilled his or her functions with a willing and happy grace.

GENERAL ADDRESSES.

Post-graduate Teaching.

On Sunday afternoon Dr. R. KUTNER, of Berlin, gave an address on post-graduate instruction for medical practitioners in the National Museum Building. The lecture was fairly well attended. He maintained the thesis that medical education cannot be regarded as complete when a student qualifies and leaves his medical school. The advance of science renders it absolutely necessary for him to continue to learn during the whole course of his medical career. Practitioners should be enabled to supplement their professional knowledge without incurring a considerable expenditure of time or money. Under these conditions Professor Kutner considers that post-graduate courses should be given gratuitously to practitioners in their own countries, and that the courses should be held at a convenient situation in or near the town or village in which he resides, and at a time which does not interfere with his professional work. In large towns the courses could be held at or in connexion with local hospitals, and should be given by medical men with experience in teaching. The subjects taught should include all branches of theoretical and clinical medicine, as well as the allied sciences, which now form part of modern medicine. Medical politics should also be taught. The lecture, demonstrations, and practical classes at present given at scientific institutions and hospitals should be supplemented by the establishment of institutes exclusively for the purpose of post-graduate instruction. Professor Kutner was of opinion that far too little is done in this direction, and regarded England as backward in the matter.

In connexion with this lecture an international commission for post-graduate instruction was formed.

Pre-Columbian Diseases.

Professor EUGÈNE HOLLÄNDER (Berlin) gave an address on diseases in the pre-Columbian era in the old House of Parliament. He based his remarks on studies made in the ancient Peruvian collection of the Berlin Museum. The questions which he examined included those concerning mutilations and diseases discovered and depicted in the carvings, mouldings, and paintings of the tribes of the Incas and the Huacos. He found that these pictorial records enabled the investigator to follow the individual member of the tribe from his birth to his death, and to study his habits of life. Although he did not feel justified in identifying the diseases of which he obtained records with leprosy, syphilis, and lupus, he was able to point out considerable resemblances. The pathology of what is known as Peruvian lupus or uta is obscure, and in the absence of etiological details it is impossible to deal minutely with the disease. In conclusion, he recorded the fact that amputations were performed by the Inca tribesmen.

THE SECTIONS.

A General Survey.

From the point of view of smooth working and satisfactory results, the organization of the twenty-one sections of the Congress was considerably better than was the case in Lisbon and Madrid. In most sections the rooms in which the meeting were held were satisfactory, and in a few large, commodious, and well-appointed lecture theatres served their purpose excellently. The attendance was fair in the majority and very good indeed in a few, notably medicine, surgery, and neurology. There was, however, a very great deal of overlapping, which rendered the attendance difficult for those members who wished to listen to discourses on subjects of specialized interest. An example of this overlapping may be mentioned. In the section for general pathology, in that of anatomical pathology, in that of hygiene and immunity, in that of medicine, and in that of therapeutics, various branches of therapeutic or prophylactic immunization were included. No hard and fast line can be drawn between general and anatomical pathology, and the creation of two sections caused inconvenience in several instances. In the next place overwhelmingly long programmes had been prepared, and the number of absentees was inexcusably great. As is usual at Continental gatherings, the sections were unpunctual, and in one if not more cases the proceedings began more than an hour later than the advertised time. The discussions for the most part were of little importance, and few members availed themselves of the opportunity. Heated arguments were fortunately rare. After a moderately severe morning's work on the first day, the majority of the sections closed their doors until the morrow, and the members availed themselves to a considerable extent of the opportunity of visiting some of the institutions connected with their special subjects in Budapest. The old sin of reading papers which had been read or published in almost identical words elsewhere was freely committed not only by the small unknown man, who aims at notoriety by offering his colleagues matter of doubtful scientific value, but also by some great professors.

The papers were listened to with considerable interest, and with a degree of decorous silence, partial or complete, which contrasted well with the behaviour which has been experienced at former international congresses. Among the subjects which attracted special attention the following may be mentioned: A discussion on appendicitis; one on immunity, including anaphylaxis; puerperal infection; uterine myomata; tuberculin treatment of tuberculosis; malignant disease of the larynx. The special lectures by Bashford, Gruber and Siegmeth were well attended. Doyen also delivered a special lecture, and had placarded the announcement of the same everywhere. His audience, however, consisted of a number of persons who, either from inquisitiveness or foolishness, were prepared to support a procedure which the majority of the scientific members deliberately condemned. Brief accounts of some of the more important papers and discussions will be given in a subsequent issue.

Mention should be made of the fact that the Sixteenth Section served at the same time as the Eighth International Congress of Otology. Considerably smoother working would have been attained in the individual sections had a set programme been made out beforehand, and either published in the daily journal or posted in the room. The general programme was not taken in order in the great majority of cases, and it was difficult to ascertain previously when a special subject would be discussed.

The English Members.

In one of the reading rooms copies of the BRITISH MEDICAL JOURNAL and *Lancet*, as well as of the daily papers, were provided, and many facilities were extended which contributed toward making the stay of the British medical man a pleasant one.

A soirée had been arranged for Sunday evening, to be given by the President, Professor Müller, but had to be postponed on account of the regrettable sudden attack of illness. It is, however, gratifying that the President recovered rapidly, and was able to take part in the proceedings later in the week.

(To be continued.)

THE "RED CROSS" IN PERSIA.

WE are indebted to Dr. A. R. Neligan, Physician to the British Legation, Tehran, for the following notes.

The recent fighting at Tehran was remarkable, among other things, for the first appearance of the Red Cross Society in Persia. Sipahdar, the commander of the northern section of the Nationalist forces, was accompanied from Resht (the capital of the province of Ghilan, which skirts the Caspian Sea) by an Armenian doctor who holds an American degree. He had with him several helpers, both male and female—members of the Red Cross Society—and a supply of medical and surgical necessities, including a number of camp beds. During the fighting which took place outside Tehran a hospital was set up at the village of Hessarek; there the wounded were collected and treated. A few days after the capture of Tehran by the Nationalists those wounded, to the number of twenty-eight, were brought into the town and placed in a large Persian house (once the Park Hotel), over which the Red Cross flag was hoisted. There were already in the house about a dozen Nationalists who had been wounded in the fighting in the town, and who, with others, were being treated by Dr. Scott, Medical Superintendent of the Indo-European Telegraph Department. On visiting this extemporized hospital I was agreeably surprised to find all in very good order, and white-gowned nurses, both male and female—all Armenians—in attendance, with the red cross on their arms. Other wounded were being treated at the Persian Government Hospital and at a native hospital.

The number of casualties it is difficult to give, even approximately; it can, however, be stated that they were very few in comparison with the tremendous fusillade which was carried on for parts of four days and nights. Ancient and modern rifles, bombs, Maxims, quick-firing Creusot guns, and brass 15-pounders, firing shrapnel, were used. Probably the Nationalists had about 100 men put out of action, of whom 20 were killed outright or died later. On the Royalist side it is known that about 40 men of the Silakhori regiment alone were killed in one attack on some sangars at the east end of the city. Most of the wounded whom I saw had been hit by modern bullets, and the mercifulness of these missiles was once more exemplified, except where they had been "spread" by first hitting a wall, etc. It was often difficult to tell which was the wound of entrance and which of exit. Most healed quickly under the first applied dry dressing. The following are some of the more interesting cases I saw:

1. A Jewess who had been shot through the lower part of the chest and the abdomen, and had no symptoms. The bullet—a small-bore—had entered in the right anterior axillary line in the eighth intercostal space, and had emerged 3 in. from the spine, on the left side, just below the twelfth rib. She had also been hit in the middle of the left forearm; the bullet had entered obliquely, had splintered the radius, and caused a large irregular ("explosive") exit wound.

2. An Armenian, shot through the right side of the chest. The bullet—a small-bore—entered in the right anterior axillary line in the fourth interspace, and emerged at a somewhat lower level behind, close to the right side of the spine. There was no haemoptysis or haemothorax. The man was a very restless, excitable individual, and could not be kept quiet. Signs of consolidation of the upper and posterior part of the lowest lobe of the lung appeared on the second day. On the third day he rather suddenly grew worse—pneumothorax with emphysema of the chest wall was found to have developed. He died.

3. An Armenian who was hit in the left cheek by a bullet, which had glanced off a wall, causing a huge gaping lacerated external wound. The left superior maxilla was practically blown away, with most of the hard and soft palates and part of the left side of the tongue. Splinters of bone were driven into the opposite cheek. There was much shock, but not much haemorrhage. Tremendous swelling of the left side of the face followed, and subconjunctival haemorrhage in the left eye. Pieces of bone and slough were removed daily. It was impossible to prevent the wound from becoming horribly foul. The man had to be fed per rectum. Eventually the condition of the tissues improved so much that Dr. Scott was able to draw the edges of the wound together with wire sutures. The future is, however, not very bright for the poor fellow.

I was struck by the number of wounds received in the region of the groin—through the upper end of the thigh, just inside or outside of the great vessels. Some of the wounds of exit were in the opposite buttock. Most of these cases had no symptoms beyond pain and stiffness.

LITERARY NOTES.

MR. G. MUNRO SMITH, Consulting Surgeon to the Bristol Royal Infirmary, sends us the following note containing an interesting suggestion as to the source of some of the "visions" on which William Blake founded many of his most striking drawings: "Whilst examining some of the drawings of William Blake I was much struck by the irregular zigzag outline which is present in several of them, notably in one called 'The Ancient of Days,' and in two or three illustrations to the Book of Job. This very peculiar embellisbment gives to the picture a weird and rather terrible appearance, and it is possible that Blake introduced it for this purpose. But if we compare the fortification-like angles and lines in the engraving of 'The Destruction of Job's Children' and in 'Job's Dreams' (Fig. 1) with the Sinistral Teichopsia figured as a prodroma of migraine in Dr. Hubert Airy's paper reproduced in Dr. Liveing's book on migraine (Fig. 2), the similarity is so great that it has occurred to me that probably Blake suffered from this form of premonition of sick headache and reproduced it in his drawings. With an ordinary artist this would seem unlikely; but we know from the testimony of several that Blake declared that he actually saw many of the things he drew. The visionary heads he copied for his friend Varley were, according to Blake, actual copies from the spectre of the individual who came, at his bidding, to 'sit for his portrait.' When we further remember that these 'visions' could only be conjured up occasionally, and that Blake was, to say the least of it, very eccentric, it does not seem improbable that we have in these much-talked-of drawings of the artist-poet an interesting reproduction of his own premonitory visual symptoms of migraine. Whether there is any evidence that he suffered from headache I do not know, but the absence of such evidence does not disprove the probability of this suggestion, which I give for what it is worth." As Mr. Munro Smith leaves in doubt the question whether Blake suffered from headache, and as evidence that he did would have gone far to confirm the suggestion made in the above note, we asked Mr. Henry B. Wheatley if he knew of the existence of any evidence on the point. He very kindly took much interest in the inquiry, and informs us that after going through Gilchrist's *Life of William Blake* page by page he can find no mention of headaches, nor, indeed, any reference to illness of any kind. It is not probable that any facts overlooked by Gilchrist would be found in other works on Blake, and a less detailed search of two such books afforded no information on the point.

Fig. 1.

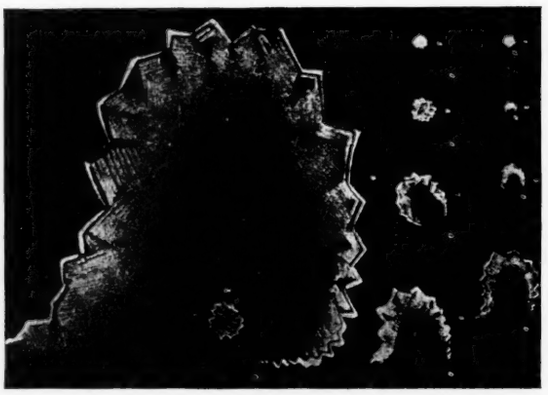


Fig. 2.

We are indebted to Mr. Munro Smith for the following note also: "In the Literary Notes of the JOURNAL for August 7th there is a brief notice of the last Linacre lecture in which Professor Osler suggests that 'Linacre may have been the scholar who gave Browning the idea of the "Grammarian's Funeral."' The age in which Linacre lived (the period of the revival of learning in Europe), his devotion to learning, his classical studies, and his death from calculus all point to this conclusion. It has struck me, however, that the resemblance to other great scholars, who have devoted themselves to learning regardless of all other considerations, is so close that probably the prototype is 'composite.' For instance, one of the greatest grammarians, Samuel Johnson, was, like Browning's hero, 'soul-hydroptic with a sacred thirst' for knowledge of all kinds, which he cultivated in the teeth of ill health; he also lived for many years 'nameless,' and had this further likeness that in his youth he had, according to Boswell, a countenance 'of the cast of an ancient statue' (He was a man who had thy face and throat, lyric Apollo!)

"But there is perhaps a still greater resemblance (as pointed out to me by Dr. Alexander Smith) between 'the Grammarian' and Isaac Casaubon, who lived, if not in the Renaissance, yet in the immediate wake of it. He was not only a keen scholar, working early and late at his books, but he had the essential characteristic of Browning's hero—an utter contempt for health and all worldly advantages compared with the acquisition of knowledge. 'When the claims of business or society have taken up any considerable part of a day, his outcries are those of a man who is being robbed. When he has read continuously a whole day from early morning to late at night, "*noctem addens operi*," he enters a satisfactory "To-day I have truly lived"—"*Hodie vixi*" (Mark Pattison's *Isaac Casaubon*, cf. Browning's "Before living he'd learn how to live"). Towards the end of Casaubon's life he was harassed with 'phlegm in the air passages' and a 'hacking cough' ('tussis attacked him'), and suffered intense pain from vesical stones ('calculus racked him'). He, moreover, like Browning's hero-scholar, had his 'thoughts on eternity' and 'reckoned not the number of his years, felt not the encroachment of age, or the sap of health, or the decay of his body.'"

BRITISH MEDICAL BENEVOLENT FUND.

AT the August meeting of the committee 16 cases were considered, and grants amounting to £155 made to 15 of the applicants. Appended is an abstract of the cases relieved:

1. Widow, aged 39, of M.D., C.M.Aberd. Left penniless at husband's sudden death three years ago, and now endeavours to support herself by letting lodgings. Two children, aged 11 and 9. Relieved twice, £10. Voted £12.

2. Daughter, aged 53, of late M.R.C.S., L.S.A. Used to act as a nurse-companion, but is now unable to obtain a post on account of failing health. Relieved seven times, £61. Voted £12.

3. L.R.C.P.Edin., aged 65. Used to have a good practice, but family troubles have exhausted his means, and he is now compelled to give up work owing to ill health. Children unable to help. Voted £18.

4. Daughter, aged 58, of late M.R.C.S., L.S.A. Has supported herself since father's death forty years ago, but is now in feeble health. Voted £10.

5. Daughter, aged 59, of late L.R.C.P.I. Since father's death in 1870 has maintained herself by teaching, but now finds it impossible to get pupils, and is dependent on an elder sister whose income is only 15s. a week. Voted £12.

6. M.R.C.S., L.R.C.P., aged 41. Practises near London, but is in temporary difficulties owing to ill health. Four children, 12 to 7. Voted £9, with leave to apply again in six months.

7. Lady practitioner (L.R.C.P. and S.Edin.), aged 34. No income, and has been incapacitated for the last three years by ill health. Friends unable to help. Voted £18.

8. Daughter, aged 60, of late M.R.C.S. Maintained herself as a dispenser for several years, but is now unable to obtain

another post. Small earnings by wood carving and slight help from a sister who has to earn her own living. Relieved three times, £36. Voted £10.

9. M.R.C.S., aged 70. Incapacitated by locomotor ataxy, and only income an Epsom College pension of £30. Slight help from son earning a small weekly wage. Relieved twice, £24. Voted £5.

10. Daughter, aged 61, of late M.R.C.S., L.S.A. Used to be a housekeeper, but has had two slight epileptic strokes. Relieved three times, £36. Voted £12.

11. Daughter, aged 63, of late M.D., M.R.C.P.Lond. Was at one time amply provided for, but mortgaged her property to assist her father, and at its realization was barely able to repay the loan. Has just obtained a pension from another charity. Relieved twice, £22. Voted £5.

12. Widow, aged 50, of L.R.C.P., L.R.C.S.Edin. Quite unprovided for at death of husband a few years ago; slight help from a brother-in-law and small earnings by needlework. Two children, aged 18 and 16. Relieved four times, £40. Voted £12.

13. Widow, aged 79, of M.R.C.S., L.S.A. Has a small income, but is obliged to maintain three deaf and dumb children. Relieved seven times, £60. Voted £5.

14. Daughter, aged 57, of L.F.P.S.Glasg. Has earned a living since the age of 16, and helped to support her mother until her death. Now unable to command a salary, but receives a home in return for services. Relieved twice, £10. Voted £5.

15. Widow, aged 54, of L.R.C.P.Edin. No income, and at husband's death two years ago the practice realized barely sufficient to pay unavoidable debts. Slight help from children. Relieved twice, £20. Voted £20.

Contributions may be sent to the Treasurer, Dr. Samuel West, 15, Wimpole Street, London, W.

MOTOR CARS FOR MEDICAL MEN.

A CORRECTION.

THE Clement Talbot Company, Limited, Barlby Road, North Kensington, W., have recently begun to supply a 12-h.p. landaulette, especially designed for the use of medical men. In an advertisement of this, published in our columns last week, it was, by a clerical error, stated that the price of the car complete was £365. It will be seen by an advertisement elsewhere in this issue that the price of the car is £485. Very favourable reports on the performances of the cars made by this company have recently been brought to our notice. We are informed, for instance, that in the competition last week of the Derby and District and North Stafford Clubs a 15-h.p. Talbot, belonging to Mr. J. L. Kirk, won the Uttoxeter Cup on formula and the medal for second fastest time in the annual hill climb. In the competition for the Reyersbach Cup, Potchefstroom, Transvaal, both the first and the second cars were of this make.

AN IMPROVED ELECTRICAL ACCUMULATOR.

Medical men who have practical experience of electrical accumulators and the various troubles connected with them, chief of which is the corrosion of the points of contact by acid spray, will be interested to hear that the Millswood Engineering Company (South Brent, Devon) have placed upon the market an improved form of apparatus which is likely to be of special use for motor cars. A new form of terminal, which is hollow and made of non-conducting material, is its distinguishing feature. The terminal completely surrounds and encloses the metallic contacts, thereby affording protection against any accidental short-circuits and also shielding the metal from dirt and acid spray. In this manner increased usefulness and reliability for the accumulator are ensured.

AN AUTOMATIC CARBURETTOR.

A mechanically automatic carburettor—the Claudel-Hobson—which has won high awards in France on the ground that it is compact and easy to fix, and favours silent running and easy starting, has been introduced into this country by the H. M. Hobson Company, of 29, Vauxhall Bridge Road, S.W. This company offers to fit the carburettor and to replace it by the original if found unsatisfactory. It is further claimed for this carburettor that it effects a considerable economy in petrol. We are informed, for instance, that in one independent experiment made with a 30-h.p. Daimler the saving was more than 50 per cent.

STEAM CARS.

A. E. T. asks for the experience of medical men who have used steam cars, especially with regard to reliability and running cost as compared with petrol cars. Our correspondent asks more particularly with regard to the Turner-Miesse car.

*** There is a short note upon this subject in the article on motor cars for medical men, published in the BRITISH MEDICAL JOURNAL of March 23rd, 1907, p. 695. This note led to a communication being received from Dr. E. H. O. Sankey, of Boreatton Park, Baschurch, who stated (BRITISH MEDICAL JOURNAL, April 6th, 1907, p. 848) that he had driven a Turner-Miesse car for some years, and was satisfied with its performance and also with the cost of running. He considered that the only valid objection to steam cars was that they took about fifteen minutes to get up heat enough for the road from dead cold. In a further article on steam and electric cars, published in the JOURNAL of December 12th, 1908, p. 1759, the advantages and disadvantages of steam cars were briefly discussed.

THE WINTER SESSION IN THE MEDICAL SCHOOLS.

THE arrangements in view for the opening of the winter work at most of the medical schools will be found in the following paragraphs. At some institutions details are not yet finally settled.

ST. BARTHOLOMEW'S HOSPITAL.—The opening ceremony will be the old students' annual dinner, which, as usual, will be held in the Great Hall of the hospital on October 1st at 7 p.m. punctually. The chair will be taken by Dr. W. P. Herringham.

ST. THOMAS'S HOSPITAL.—The winter session will commence on Friday, October 1st, without formal ceremony. The annual dinner of old students will take place the same evening at the Hotel Cecil at 7 for 7.30, Mr. J. B. Lawford in the chair.

ST. GEORGE'S HOSPITAL.—The winter's work will be inaugurated at 3 p.m., on October 1st, by an address by Dr. H. D. Rolleston entitled St. George's and the Progress of Physic. It will be followed by the annual meeting of the St. George's Club. The old students' annual dinner will be held the same evening at Prince's Restaurant, Mr. A. Marmaduke Sheild in the chair.

THE LONDON HOSPITAL.—Work for the winter session will begin on Friday, October 1st, on which date the staff will hold an afternoon reception in the college library from 3 to 5 p.m. The old students' dinner will take place the same evening at the Savoy Hotel, Dr. F. J. Smith in the chair.

MIDDLESEX HOSPITAL.—The winter session will commence on Friday, October 1st, when an introductory address will be delivered by Dr. J. Strickland Goodall; a prize distribution will follow. The annual dinner of past and present students will take place the same evening at the Trocadero at 7 p.m., Mr. John Murray in the chair.

UNIVERSITY COLLEGE HOSPITAL.—The winter term will be inaugurated on Friday, October 1st, by an address in the library of the school at 3 p.m. from Sir John Tweedy. The dinner of past and present students will be held the same evening at the Gaiety Restaurant, Mr. A. P. Gould in the chair.

ST. MARY'S HOSPITAL.—The winter session will commence on Friday, October 1st, when the prizes and awards for the sessions 1908-9 will be presented by Dr. H. A. Miers, F.R.S., Principal of the University of London, at 3 p.m., in the Medical School Library. The annual dinner of past and present students will be held at the Café Royal, Regent Street, W., on Friday, October 1st, at 7 p.m., Dr. Milner Moore in the chair.

KING'S COLLEGE HOSPITAL.—The winter's work will commence without formal ceremony on Friday, October 1st. The dinner of past and present students will be held the same evening at 6.30 for 7 p.m. at the Waldorf Hotel, Aldwych, W.C., Mr. T. F. Hugh Smith in the chair.

WESTMINSTER HOSPITAL.—As in recent past years, term will commence without formal prelude, on Monday, October 4th. On the following evening, Tuesday, October 5th, past and present students of the hospital will meet at dinner at Oddenino's Imperial Restaurant, when Dr. H. G. Hebb will take the chair.

CHARING CROSS HOSPITAL.—The winter session will be opened on Monday, October 4th, by the annual distribution of prizes and an address to students. The ceremony will take place in the out-patients' hall of the hospital at 4 p.m., the prizes being handed to the successful students by the Right Hon. Viscount Ridley, who will also deliver an address. The dinner of past and present students will be held the same evening at the Criterion, Dr. William Hunter in the chair.

THE LONDON SCHOOL OF MEDICINE FOR WOMEN.—The winter work will be inaugurated at 4 p.m. on Friday, October 1st, by an address from Mrs. Henry Fawcett, LL.D. The ceremony will take place, as usual, at the school buildings, 8, Hunter Street, Brunswick Square.

UNIVERSITY OF DURHAM.—The winter session will commence on Monday, October 4th, without any formal opening ceremony.

UNIVERSITY OF MANCHESTER.—The winter session will be inaugurated at 4.30 p.m. on Friday, October 1st, by an address from Professor G. R. Murray on the development of modern medical education.

UNIVERSITY OF LIVERPOOL.—Work for the winter in the Medical Faculty will commence on Tuesday, October 5th, being inaugurated by the delivery of an address by Mr. Charles A. Ballance, in the Arts Theatre of the University, at 4 p.m.

UNIVERSITY OF LEEDS.—An address inaugural to the commencement of the work of the winter session will be delivered at 4 p.m. in the School of Medicine by the Right Hon. Lord Justice Fletcher Moulton, entitled Some Thoughts on Causation in Health and Disease. The annual dinner will be held the same evening in the library of the school.

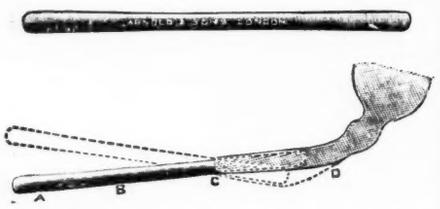
UNIVERSITY OF SHEFFIELD.—The winter's work in the Medical Faculty will commence on Wednesday, October 6th, without formal ceremony.

NORTH-EAST LONDON POST-GRADUATE COLLEGE.—The winter session will commence on Thursday, October 7th, being inaugurated by an address delivered by Mr. J. Bland-Sutton to the members of the College and North-East London Clinical Society conjointly.

MEDICAL AND SURGICAL APPLIANCES.

A Urethral Dilator.

MR. JAMES MACMUNN writes: Infiltrations of the anterior urethra have only recently been recognized as salient causes of gleet, although this takes us back to the dictum of Otis and its partial truth, that "gleet means stricture." Kollmann's dilators, if scientifically used and adapted, are a distinct advance, but this is the exception. They fail to dilate just where this is required, at the end of the urethral bulb D. They dilate too extensive an area at one time, and they dilate too uniformly a passage which is not uniform in size at different sites. It is essential also to stretch the urethra longitudinally as well as transversely. I have used the instrument figured (made for me by Messrs. Arnold and Sons) for some years. It is cheap, simple, and effective. I possess six sizes; each instrument includes two. I pass the largest I can down to the end of the bulb, stretching the penis over it. The urethra will extend fully 1½ in. beyond its resting length. I run my fingers along the outside to use massage and empty follicles; this is important. Then, making the thumb the power, and fingers the fulcrum, at A and B the sound is made a sliding lever to distend the canal on withdrawal. The roof is stretched by reversed power. The mode is effectual and allows of some play for intelligence. The penis is extended all the time. Every urethra possesses its individuality.



Medical News.

THE third International Congress of School Hygiene, to be held in Paris, has been postponed until the first week of next August (1910).

THE estate of the late Dr. Andrew James Duncan, Consulting Physician to the Dundee Royal Infirmary, who died on July 7th, has been sworn at the value of £23,612.

THE new ward wing and the nurses' home of the Glasgow Cancer Hospital, Hill Street, Garnethill, have been completed. It is hoped that the whole building will be finished next spring.

THE results of the census of religious bodies taken in the United States in 1906 have recently been published, and it appears that 72½ per cent. of the Christian Scientists are of the female sex.

THE Governor of the German territory of Kiantschau in China has issued an order rendering illegal the possession or importation, without special licence, of morphine, or morphine syringes or needles. Licences will be granted only to doctors, apothecaries, and hospitals.

THE War Office announces that existing vacancies for staff nurses in Queen Alexandra's Imperial Military Nursing Service will be filled at once. Full particulars as to the conditions of service and forms of application for admission can be obtained by applying to the Secretary, War Office, Whitehall, S.W.

THE annual meeting of the Caledonian Medical Society will be held in the Town Hall, Lancaster, on Friday, September 17th, at 3 p.m., under the Presidency of Dr. David Blair, of Lancaster. In addition to the presidential address, an interesting communication on the '15 and the '45 in Lancaster has been promised by Dr. H. MacCalman, and the municipal Charters and Insignia of Lancaster will be exhibited and described by the Town Clerk, Mr. T. Cann Hughes, M.A., F.S.A. The annual dinner of the society will be held the same evening at the County Hotel, Lancaster.

TUBERCULOSIS exhibitions such as the one now in progress at the White City, and as that which proved so successful in Ireland, seem popular in the United States. Last year the New York State Charities Aid Association did a considerable amount of work in this direction; and this year, according to the *New York Medical Journal*, six separate exhibitions have been planned, and are to be sent to forty-two fairs in New York State. They will be accompanied by graduates of Columbia University who have been prepared for their management and demonstration by a special course of lectures.

THE Metropolitan Asylums Board has made arrangements for two separate courses of lectures and demonstrations in hospital administration for the benefit of candidates for the Diploma in Public Health. They will begin respectively on the first Monday and the first Wednesday in October, and, except that they will take place at different institutions, will cover the same ground. The courses will last three months and the lecturers are Dr. McCombie of the North-Western Hospital and Dr. F. M. Turner of the South-Eastern Hospital. The fee is £3 3s.

THE centenary of the birth of Oliver Wendell Holmes is to be celebrated by the Medical Society of the county of New York next month. The precise date of his birth was August 29th, 1809, the year in which Darwin likewise first saw the light. The position which Holmes occupied during his lifetime was of quite an exceptional character, for while his books were, and indeed still are, popular among all cultivated classes, he remained in the active service of medicine for long over thirty years as Professor of Anatomy at Harvard, and exercised a distinct influence on medical thought by his early advocacy of the view that puerperal fever was an infectious malady.

AT the Congress of the French Association for the Advancement of Science at Lille, at the beginning of August, the views as to the value of radiography in the diagnosis of fracture, which M. Lucas-Championnière had previously expressed in his address at Cardiff, met with general support. MM. Mouchet and Lamy thought the method a valuable means of controlling other clinical observations, but that the information it gave was only a part of that by which the surgeon should be guided in making a diagnosis; M. Joubert pointed out that a radiogram might fail to show certain fractures, and might not reveal the existence of callus, even in some cases where it had already become firm.

THE second International Food Congress will be held in Paris from October 17th to 24th, under the patronage of the Ministers of Agriculture, Commerce, and of the Interior, and under the presidency of Dr. Bordas, Director of the Laboratories of the Ministry of Finance. The first congress was held in Geneva in 1908, it was promoted by the Society of the White Cross of Geneva, founded in that year, with the object of bringing into co-operation national organizations for the amelioration of social conditions in various countries. The congress in Paris will comprise three sections: The first on alimentary technology, the second on hygiene, and the third on crude drugs, essential oils and crude aromatic substances, chemical products and mineral waters. Among the subjects to be discussed will be sausage making, refining of lard, the preparation of food fats, the curing of meats, and the production of syrups and biscuits. The Honorary Secretary for Great Britain is Mr. Loudon M. Douglas, 3, Lauder Road, Edinburgh, from whom further particulars can be obtained.

THE Natural History Department of the British Museum has received a cast of the fossil human lower jaw found recently some 70 ft. below the surface in a sand deposit at Mauer, near Heidelberg. It was found along with fossil remains of a rhinoceros and elephant, similar to those met with in the Cromer forest beds, and Dr. Shoetensack, who has published a description of the jaw, considers that it may be referred to the later pleistocene epoch. The discovery of this "Heidelberg man," therefore, takes the antiquity of the human race back to an age earlier than the famous Spy and Neanderthal skulls. The jaw is massive, and has no chin, in which respects it presents ape-like characters, but the teeth are distinctly human; the molars have five cusps, the canines are not specially prominent, and the dimensions of the teeth generally are within the limits of variation at the present day. The skull is exhibited in a case which contains also casts of *Pithecanthropus erectus* from Java, the Neanderthal skull, the Gibraltar skull of the same type, the Spy skull and limb bones, the Cannstadt skull, and the Tilbury skull described by Owen.

British Medical Journal.

SATURDAY, SEPTEMBER 11TH, 1909.

THE ANNUAL REPORT OF THE COMMISSIONERS IN LUNACY.

THE SUPPLEMENT for last week contained a summary of the Annual Report of the Commissioners in Lunacy for the year 1908.[1] The report is noteworthy because, in addition to the usual statistical information concerning the certified insane, it contains the comments of the Lunacy Commissioners on the conclusions and recommendations of the Royal Commission on the Care and Control of the Feeble-minded—a matter in which public interest has been recently revived by the conditional promises held out by the Secretary of State to the deputation which he received last week. The statistical information is fully dealt with in the summary already published,[2] and it is unnecessary here to do more than allude to outstanding features. These, which are merely accentuations of what has been recorded year by year for some time in successive annual reports, are, first, an increase in the numbers of the certified insane, both absolutely and relatively to the population at large; secondly, an increase, both absolute and relative, in the number of admissions to asylums; and, thirdly, declining recovery and death-rates. Thus in the last ten years the certified insane have increased from 105,086 to 128,787, or from 1 in every 303 to 1 in every 278 of the general population. The yearly admissions have risen from 19,289, or 6.05 per 10,000 of population, to 22,244, or 6.29 per 10,000 of population, and the yearly first admissions from 15,752, or 4.94 per 10,000, to 18,346, or 5.18 per 10,000. During the same period the recovery-rate, calculated on the total number under treatment, has fallen from 7.37 per cent. to 6.24 per cent., or calculated on the admissions from 39.26 per cent. to 35.38 per cent.; and the death-rate, calculated on the daily average number daily resident from 9.87 per cent. to 9.39 per cent. These figures, as we have said on many previous occasions, do not afford sufficing evidence of any actual increase in the occurrence of insanity. On the other hand, careful statistical inquiry tends rather to show that this apparent increase is due to two main causes—accumulation within asylums and a greater rate of flow from the considerable reserve of uncertified insane in the country into the certified class. In this relation the Commissioners this year draw attention to an interesting fact—namely, that the opening of new asylum accommodation has the effect of considerably raising the admission-rate of new cases by encouraging the removal from workhouse care of more than the usual output, and, possibly, they add, by favouring a greater freedom of certification. In what way the provision of fresh accommodation acts as a stimulus to certification affords room for conjecture; but, whatever the cause, the fact remains that the numbers under detention have increased within ten years in provincial asylums by 29 per cent., and in London County Asylums by 55 per cent. This is sufficiently serious from the economic point of view, more particularly as it is the pauper and dependent class which furnishes almost the entire increase. The problem becomes yearly more pressing, but until enough is known of the causation of insanity to allow of the sure limitation of its occurrence, its destruction in the seed—which time is not yet—the first and obvious thing to be done is to devise some more economical ways of providing for the insane. To the Commissioners' suggestions to the Lord Chancellor on this point we shall revert later.

In former years the Commissioners, in tabulating the various assigned causes of insanity, have given the relative proportions of the etiological factors in the total admissions. This year, having adopted the new tables drawn up by the Special Committee of the Medico-Psychological Association, the Commissioners also supply tables setting forth the assigned causes in the first-attack cases only among the direct admissions. In our summary, for the sake of uniformity with previous years, we have followed the old plan; but inasmuch as the first-attack cases are likely to yield more accurate results, it may be stated here that in these cases alcoholism was assigned as cause in 16.9 per cent., acquired syphilis in 5.5 per cent., influenza in 3.1 per cent., critical periods in 18.5 per cent., and mental stress in 23.0 per cent. Epilepsy was assigned as cause in no less than 5.8 per cent. of the first-attack cases, and other nervous diseases as an additional 4.2 per cent. The comparative frequency of cardio-vascular degeneration in association with insanity is commented upon by the Commissioners, who give the proportion as 4.4 per cent. We see that the proportion in the first-attack admissions was 3.8 per cent., but doubtless this is well below the truth. As to hereditary influences, an insane heredity was ascertained in 21.9 per cent., an alcoholic heredity in 5.3 per cent., and one of other neuropathies in 3.6 per cent., giving a total neuropathic heredity in 30.8 per cent. of the first-attack cases.

With regard to the relative distribution of the various forms of insanity in the admissions, the causes of death in asylums during 1907, and an interesting comparison of these with the same causes of death and their relative proportions in the community at large, we would refer to the summary already mentioned.

The Commissioners' remarks express a general concurrence on all vital matters with the recommendations of the Royal Commission on the Care and Control of the Feeble-minded. With regard to the provisional measures recommended by the Royal Commission of amalgamating the office of the Chancery Visitors with that of the Lunacy Commissioners and of the appointment of two additional Medical Commissioners, they anticipate no difficulty in arranging the work of the amalgamated body, should the Lord Chancellor adopt this recommendation, and very heartily concur in the advisability of the latter recommendation. Further, and in conclusion, they revert to certain suggestions contained in the report of the Royal Commission concerning additional modes of providing for certain classes of the insane, which, they think, might properly receive early attention pending the consideration of the scheme as a whole. In the first place, they agree that much might be done to obviate the necessity for costly asylum extensions by the erection, in connexion with existing asylums, of cheaper buildings for mild chronic cases and by the founding of farm colonies.

[1] *Sixty-third Report of the Commissioners in Lunacy.* London: Eyre and Spottiswoode. 1909. (Pp. 570; price 2s. 11d.)
[2] SUPPLEMENT, September 4th, 1909, p. 211.

In the second place, they express themselves as entirely in favour of the extension of the boarding-out system. They point out that under the limitations imposed by Section 57 of the Lunacy Act boarding-out is practically a dead letter in England and Wales, and with regard to the analogous class of outdoor pauper imbeciles—or quarterly lunatics, as they are sometimes called—that the present supervision is not at all satisfactory. They hold strongly that all of these cases should be visited by members of the Lunacy Board, though this would necessitate the further numerical strengthening of the Board. Further legislation, they say, would be required, but under proper safeguards and in suitable cases boarding-out would be beneficial, they think, to the patients themselves and to the public purse. Finally, as already mentioned in our issue of August 21st, they believe that much benefit would accrue from the provision of observation wards, reception houses, and mental hospitals into which the insane could be received on the first manifestation of derangement. They therefore urge the desirability of fresh legislation providing for the notification and registration of cases of "unconfirmed" insanity, extending the principle beyond the limits of cases in "single care" so as to include observation wards, reception houses, and special hospitals. These suggestions, the Commissioners say, could be brought about by only slight modifications of the Lunacy Acts, and there can be no doubt that their adoption by the Lord Chancellor would prove of immediate value. From them would follow a considerable pecuniary saving; the formation of special hospitals and psychiatrical clinics with their attendant advantages to the scientific study and treatment of insanity, and improved conditions for many thousands of insane people.

They would not, however, have the effect of bringing under official cognizance and control the great numbers of the mentally defective—imbecile, epileptic, criminal, and drunken—who at present escape the net of certification, and who, for want of training and control, are lifelong cares to their parents, dangers to society, and a menace to posterity. Nor would they ensure the creation of a single co-ordinated body having the care and control of all cases of mental defect or disorder in the country. Judging from the reply of the Home Secretary last week to the deputation organized by the Charity Organization Society,[3] on which the British Medical Association was represented, to urge the necessity for early legislation in order to carry out the recommendations contained in the report of the Royal Commission on the Feeble-minded, there are grounds for expecting a practical effort to be made next year. What shape this practical effort will ultimately assume after each of the departments concerned has had its say it would be idle to speculate. We have, however, the assurance of the Home Secretary that the matter is one which will have to be treated broadly and from the point of view of the general interest and of the whole country. In view, therefore, of the foregoing considerations, it would appear inadvisable to press for any provisional alterations in the law such as the Lunacy Commissioners suggest—admirable as these are—which might, to quote Mr. Gladstone, "queer the pitch" for legislation on a broad scale.

The British Medical Association, through its Medico-Political Committee and lunacy subcommittees, has been actively endeavouring to forward such broad legislation for several years, and the results of its deliberations, after correspondence and co-operation with the Medico-Psychological Association, were laid before the Royal Commission in December, 1906. We, therefore, gratefully acknowledge the Home Secretary's recognition of the efforts of the British Medical Association in this matter in his concluding remarks to the recent deputation, and feel sure that nothing is more likely to bring nearer the day of reform than the authoritative statements of the Lunacy Commissioners when they express their general agreement with the conclusions and recommendations of the Royal Commission on the Care and Control of the Feeble-minded.

[3] Supplement, British Medical Journal, September 4th, 1909.

RECENT WORK ON APHASIA.

We have until quite recently been in the habit of localizing speech and allied functions in various parts of the cerebral cortex, chiefly Broca's area—the hind part of the the third left frontal gyrus—and in the temporo-sphenoidal lobe, the posterior half of the upper temporal gyri being known as Wernicke's area. This, with the angular and supramarginal gyri, was supposed to possess special strictly limited areas concerned with visual and auditory speech, Broca's area being considered the motor speech centre. Special attention was called in these columns at the time of its first publication to the important paper in which Pierre Marie subjects these opinions to severe criticism, and reference has been made from time to time to the controversy raised by this iconoclastic deliverance. Dr. James Collier, in a recent issue of *Brain*,[1] has reviewed the present position of the matter, stating the arguments for and against Marie's theory. In his opinion, it has been proved beyond doubt that the left temporal lobe contains the chief speech centre, but the existence of an auditory speech centre in the posterior half of the second temporal gyrus is not proved, the best evidence being Déjerine's case of chronic polio-encephalitis destroying the cortex alone of this region. Dr. Collier gives the recent views of Pierre Marie on aphasia, and gives arguments in favour of and against Marie's theory. Broca's aphasia is characterized by loss or disturbance of spoken language, and some interference with internal speech associated almost always with alexia, —that is, inability to understand written or printed language—agraphia and intellectual defects, but the evidence that the condition is due to lesions of the left third frontal gyrus is admitted by many observers to be far from satisfactory. Marie himself says that no case has come under his notice which confirms the localization of a motor speech centre in the third frontal convolution. Moutier asserts that medical literature does not contain one case of Broca's aphasia in which a single lesion, strictly limited to the foot of the third left frontal gyrus, has been proved to exist upon autopsy. In 104 cases Frankel and Onuf found 4 which seemed to confirm the localization of motor speech in that convolution, but in 5 other cases of Broca's aphasia it was absolutely intact, and there was no trace of degeneration of either efferent or afferent fibres.

In addition to denying that Broca's area has any function whatever in connexion with speech mechanism, Marie challenges the conjecture that speech memories are registered in the cerebral cortex as visual, sensory, and kinaesthetic memories; he denies the existence of a visual word centre, and

[1] Vol. xxxi, p. 523.

indeed of any centre for visual speech in the angular or supramarginal gyri. He admits no distinction between sensory and motor aphasia. The sensory aphasia of Wernicke is characterized by defects of internal speech and of intelligence, and by complete or partial inability to comprehend spoken and written languages, and in consequence of the destruction of this chief speech centre, severe defects of outgoing speech, paraphasia, and jargon-aphasia are often present. In fact, there are all gradations between Wernicke's sensory aphasia and Broca's motor aphasia, but no sharp line of demarcation.

Marie would attribute all aphasia to a lesion of Wernicke's area, which he regards as the speech centre, but one that cannot be divided up into subcentres for auditory and visual speech. The entire process of speech is, according to him, governed by one centre, and the different disturbances are due to the different degrees of disturbance or disease suffered by that centre. Such a hypothesis seems to afford a more ready explanation of the variations of affections classified as aphasia. For example, an aphasic subject finds greater difficulty with a language recently acquired than with his native tongue. The hypothesis of a single centre abolishes the necessity for assuming that the numerous manifestations of aphasia are due to lesions of isolated centres, which have been postulated as existing either on very slender evidence or on none, clinical evidence having been constructed to fit the hypothetical centres. For example, no case of isolated alexia has ever been recorded and the upholders of the hypothesis of different speech centres explained this by reason of the proximity of the so-called visual and auditory centres. Marie says that he has never come across a case of Broca's aphasia without some defect of intelligence and his hypothesis of one speech centre, diffusely localized in the temporo-sphenoidal lobe, is quite consistent with this. For we know that the brain, in other diseases, manifests a more widespread disturbance than cortical localization would account for; a case of localized paralysis from a lesion in the Rolandic area is, for instance, usually a part of a diffuse though slight hemiplegia; an extensive lesion of the cuneus produces total hemianopia, but a partial lesion produces also hemianopia over the whole (hemi) field, not a complete segmental anopia.

Further, according to Marie, the classical aphasia of Broca is a combination of aphasia with anarthria—difficulty in articulation—the lesion being double: one in Wernicke's area which causes aphasia, and a second in his "quadrilateral" area. The latter is a portion of the brain bounded externally by the island of Reil, extending inwards to the wall of the lateral ventricle, and running inferiorly into the subthalmic region. It therefore includes several structures, and Broca gives the predominant influence to the lenticulostriate nucleus. The simplicity of the hypothesis which would assign speech defects or aphasia in its wider meaning to lesion of a diffuse speech centre is somewhat marred by this second postulate, although the two areas are, according to Marie, connected by a band of nerve fibres called the temporo-parietal isthmus, which skirts the posterior border of the insula. Moreover, as Madame Déjerine, an opponent of Marie's hypothesis, points out, the projection fibres of Broca's area may well be placed in the quadrilateral area as above defined.

Lesions of the first and second frontal gyri have been found to give rise to a condition described by Liepmann as apraxia, in which without any true paralysis there is inability to perform certain subjectively purposive movements, and analogy would therefore lead us to expect that a lesion of Broca's area should be manifested by inability to articulate. Marie has urged that apraxia is only part and parcel of a lowered degree of intelligence, but against this is the fact that unilateral apraxia has been met with. Therefore, although Marie's theory is more in accordance with facts, less beset with theory, and a far better working hypothesis, it does not, in Dr. Collier's opinion, rule out the possibility of Broca's area playing some part in the phenomena of aphasia. The case for the opponents of Marie may be stated in Déjerine's words: "There is in this zone (the "parts bordering on the foot of the third frontal "gyrus) a region a lesion of which determines motor "aphasia, and it does so in the absence of any "alteration of the temporal lobe."

HOSPITALS AND SCHOOL CHILDREN.

A LETTER has been addressed on behalf of the Metropolitan Counties Branch of the British Medical Association[1] to the President of the Board of Education, in which the London County Council is roundly charged with an attempt to evade the Education (Administrative Provisions) Act, 1908, which imposed on local education authorities the duty of medical inspection, and at the same time authorized them to make arrangements, subject to the approval of the Board of Education, to attend to the health and physical condition of the children educated in the public elementary schools.

Medical inspection, wherever it has been carried out in anything like a systematic manner, has disclosed the fact that the number of children requiring treatment for chronic ailments is very large, and is, in fact, in excess of the estimates made by those who a few years ago were called alarmists. In London, although as yet the work of inspection is by no means complete, it is quite clear that the number of such children is very large, and the Education Committee, which recommended to the County Council the adoption of the temporizing policy condemned by the Metropolitan Counties Branch, itself acknowledged that the number of children suffering from three classes of disorder alone—namely, discharging ears, bad vision, and ringworm, amounted to a total of over 43,000. In addition there are, of course, a multitude of children suffering from tuberculosis, anaemia, and other debilitating disorders, for whose treatment the County Council does not appear to contemplate making any provision whatever. This is a point which ought to be borne in mind, because it makes it plain that in tackling the present proposals of the County Council the Metropolitan Counties Branch is dealing with a matter of principle capable of very wide extension.

The decision of the County Council to endeavour to enter into arrangements with voluntary hospitals to treat children suffering from the three classes of disorder mentioned above was taken with a full knowledge of the nature and extent of the question to be decided and of the objections to which the scheme it has now adopted were open. Last December a report was presented to the London Education Committee by a special subcommittee consisting of members of the London County Council and of the Education

[1] SUPPLEMENT, page 218.

Committee, and of representatives of outside institutions, including the British Medical Association, the Central Hospital Council for London, the Charity Organization Society, and several of the principal London hospitals. The report of this Subcommittee stated[2] that the existing provision of private and hospital practice sufficiently meets the requirements of children requiring operative and in-patient treatment, but that with regard to the more ordinary ailments of children, and with regard to tuberculosis, the provision was inadequate and in many parts of the county non-existent. The majority of the committee, therefore, recommended that the Council should establish school clinics at suitable centres in the metropolis for the treatment of the very large mass of cases revealed by medical inspection to present physical deficiencies which could be readily and economically treated if dealt with together at suitable centres conveniently situated in regard to the schools. The President and Secretaries of the Metropolitan Counties Branch have no difficulty in showing that the provision proposed to be made through the arrangement with voluntary hospitals is inadequate in extent, and that even if it were adequate in this respect, the places where the children will be required to attend are not conveniently situated in regard to the schools. Any one even superficially acquainted with the distribution of hospitals in London is aware that the voluntary hospitals are, with few exceptions, grouped about the centre, and are nearly all within a mile or two of each other. A map was published in the Journal on January 9th, 1909, p. 100, which showed this in a very graphic manner. The proposal is, therefore, from both points of view inadequate, and must, therefore, be inefficient.

It also, as the letter to which we referred points out, violates the principle upon which voluntary hospitals are founded, inasmuch as it diverts their resources to a purpose not contemplated by those who contribute to their funds; it would swamp out-patient departments with cases requiring only routine treatment, thus running counter to the modern view that out-patient departments should be consultative, and would impose upon the medical profession a large increase in the unpaid work already done for the community. It would, in fact (to quote the words of the letter to the President of the Board of Education), involve a diversion of the funds, premises, and materials of voluntary hospitals from the purpose for which they were given by the benevolent, and for which the medical profession has contributed in charity both its services and its time.

The proposal of the London County Council must therefore be regarded as diverting the hospitals from their proper work, perverting the charitable system on which they have hitherto been conducted, and imposing upon their medical staffs an undue burden which it was never contemplated they should be called upon to shoulder, while it has at the same time the further radical defect that it must be entirely inadequate to meet the object in view.

The *Times*, in a recent issue, has drawn attention to the action taken on behalf of the British Medical Association, and has expressed its regret that London is not to follow the example of some German towns in establishing school clinics; it concludes a very outspoken article on the subject with the following words: "If the poor children concerned are to be "treated at all, the provision for the purpose should "be commensurate with the magnitude of the evil, "and should not be confined to the dispatch of a few "of the worst cases to crowd still further the often "overcrowded out-patient rooms of hospitals, and to "increase the difficulties which even now stand in the "way of the fulfilment of the legitimate purposes of "such institutions.

[2] British Medical Journal, 1908, vol. ii, p. 1873.

THE OBSTRUCTION OF MEDICAL ORGANIZATION TERRITORIAL FORCE.

We have received a letter from an officer of the Territorial Force who commands a field ambulance, complaining that his unit is required to share the drill hall of the local combatant unit, and pointing out that he had been promised suitable head quarters, on the strength of which he succeeded in raising a field ambulance, now nearly 200 strong, from a bearer company of 50. He adds that the Chairman of the County Association tells him that the practice described is usual throughout the country. We are not in a position to say whether this statement is correct or not, but we know that in some cases medical officers of the Territorial Force are even worse off than our correspondent. We know of one instance in which a field ambulance has been raised from a very weak bearer company to over strength, but has neither drill hall nor head quarters; it is only able to drill at all by the favour of other units; and we know of other units in the same unfortunate position. Our correspondent also complains that regulation harness is not supplied, and therefore the transport section has to be instructed with civilian harness, which in many cases is quite unsuitable for the purpose. This is not the way to make the medical service efficient, and it seems a pity that when the medical profession has come forward in the way it has to help to make the new organization a success, it should be rewarded by ungenerous treatment.

ASSISTANT SCHOOL MEDICAL OFFICERS IN SCOTLAND.

The Glasgow School Board makes its first, and we hope its last, appearance in the list of Warning Notices published in our advertisement columns this week. Those who think of applying for posts of part-time school medical officers at Glasgow are there urged, before doing so, to obtain information from the local officials of the Association. With a want of appreciation of the value of medical men's time unexpected in such a body as the Glasgow School Board, the sum of £40 for seven and a half hours' work a week over a period of twenty weeks a year is offered to medical men willing to act as assistant school medical officers. This compares very badly with the minimum rate of £50 per annum for two hours a week laid down by the Association. The payment is, in fact, just about half that at present received in most other places for the same work. One expected better things from a city with the spendid municipal record of Glasgow, and it is all the more surprising to find there such a narrow conception of the way in which this great new public service should be inaugurated. It is to be hoped that the Glasgow practitioner will not meekly allow himself to be exploited by the Board in this manner, and, indeed, the meeting of the Glasgow and West of Scotland of the Association and of other local practitioners, which is reported on page 217 of the Supplement of this week, had no hesitation in recommending that the terms should be refused. It remains to be seen whether the Board will find members of the pro-

fession with so little regard for the value of their own services and for the solidarity of the profession as to apply for these posts. One satisfactory feature of the meeting above alluded to is the constitution of the committee appointed to approach the School Board. The co-operation of the professorial and consulting element with the general practitioner in what is, after all, mainly a general practitioner's fight, is an example for other places, and a rebuke to those who would have us believe that the interests of the two classes are incompatible and their co-operation impossible.

GUARDIANS AND OPERATIONS.

A CONSIDERABLE amount of attention is being given at the present time to the manner in which boards of guardians perform the functions allotted to them. The Royal Commission on the Poor Law has advocated their total abolition. In some districts it is beyond dispute that persons are selected for these duties whose chief distinction is the possession of crank notions in general, and eccentric ideas of matters medical in particular. When this obtains it is not surprising that assumption, presumption, and prejudice should rule the roost. The *Hackney and Kingsland Gazette* of August 20th reports a meeting of the Hackney Guardians, at which some strong and absurd opinions were expressed by several members on the subject of surgical operations. The Children's Committee had considered the report of the medical officer of the Sidmouth Boarding-out Committee, stating that a girl chargeable to the guardians had enlarged tonsils and should be operated upon. Having also received the report of the Local Government Board inspector upon the case, the Committee recommended that the operation should be performed. An amendment to delete the recommendation was carried by 10 votes to 9. The discussion appears to have been of the type usually associated with the utterances of members of the various "anti" leagues. One of the members thought the world was going mad, and that there was a "fever for the knife"; he moved that the recommendation be deleted. "Once "they had the tonsils cut away," he remarked, "they "could not stick them on again, and the damage was "irreparable." But for the fact that these senseless arguments swayed the board, it would be altogether superfluous to refute such extravagances. Power to do mischief in this manner is a distinct danger. It is amazing that the opinions of the medical officer, the Local Government Board inspector, and the children's committee, which might reasonably have been accepted as unquestionable in this case, should be rejected with contempt because an extremist had attacked them without ceremony. The decision of the Hackney Guardians will be regarded as a triumph among the select few who accept as a truism the malicious proverb of Pope Adrian the Sixth that physicians are good for a populous country, to keep down the number of the inhabitants. The victim of this folly must suffer the penalties occasioned by the ill-advised action of a small majority of her guardians, at least until wiser counsel prevails.

ROYAL COMMISSION ON TUBERCULOSIS IN QUEBEC.

THE prevalence of tuberculosis in many parts of Canada, but especially in the older settled provinces of Quebec and Ontario, has for a good many years past, as our columns have borne frequent witness, seriously engaged the attention of medical men and economists. Much has been done by voluntary effort, but it has been felt for some time that concerted action under Government control was most desirable. The Lieutenant-Governor of Quebec, in response to representations made to him through Dr. E. P. Lachapelle, President of the Board of Health, and Dr. T. G. Roddick, formerly M.P. for Montreal, has, on the advice of the Prime Minister, Sir Lomer Gouin, appointed a Royal Commission to inquire into the practical steps which can be taken to prevent the propagation of tuberculosis in the province. The Commissioners are Dr. E. P. Lachapelle (President), Professor J. G. Adami, Dr. T. G. Roddick, the Hon. J. J. Guerin, Dr. J. E. Dubé, Dr. E. Pelletier, Dr. J. Lesperance, Mr. Charles M. Holt, and Colonel Jeffrey Burland, all of Montreal; Dr. M. J. Ahern, Dr. C. R. Paquin, Dr. A. Simard, and Dr. A. Rousseau, all of Quebec; and Dr. G. Bourgeois of Three Rivers, with Dr. C. N. Valin of Montreal as Secretary. The Commission is to sit in Montreal, and is instructed to report on or before July 1st, 1910.

FULGURATION IN CANCER.

OBSERVATIONS upon the Keating-Hart method of treating cancer are, Dr. René Desplats[1] considers, now sufficiently numerous to be grouped together and judged as a whole, and he has availed himself of the various communications made to congresses and medical societies, as well as of the experience of fifteen colleagues to whom he submitted detailed questions. Dealing with the suggestion that fulguration encourages bad surgery—that is, a too sparing surgery, he quotes Marion to the effect that fulguration should in no way modify surgical technique. The author thinks that this statement may be a little too absolute, but it is only after a surgical operation as thorough as possible that he himself submits his patients to the electrical treatment. In discussing the immediate results of the application of the spark, he refers first to the styptic effects, and points out that the coagulum which is formed on fulguration has the effect of at once changing the colour of the lesion, the tissues becoming yellow, the yellows brown, and the white reds black. Lymphorrhoea is another effect which has been noted by almost all observers, the exudation being particularly abundant in stout persons. He does not believe that septic complications result if proper precautions are taken, and he thinks that septicaemia, when it has occurred, has been due to the patient's low vitality, and cannot fairly be attributed to the method. He advises, however, shorter sittings than are commonly given, particularly when the lesions are small. In his opinion, an application for ten minutes of a 5 to 7 cm. spark upon the wound remaining after an amputation of the breast is sufficient to provoke the desired reaction, and that for smaller areas the duration should be correspondingly reduced. With the spark applied for too long a time, cicatrization is slower, and there is greater liability to infection. He admits the possibility of danger in fulgurating the region of the pneumogastric nerve, and mentions three cases in which death followed grave cardiac and respiratory troubles beginning after fulguration of large tumours of the neck. He has seen a similar result in the case of a large tumour on the floor of the mouth; death was possibly due to the fulguration of the superior laryngeal nerves. Passing to the later results of the treatment, he quotes cases of extraordinarily rapid cicatrization of large wounds—so remarkable, indeed, as to be called by Juge a "torrent of cicatrization." The success of this "spontaneous autoplastic action" largely depends upon the length of the spark and the duration of the sparking. The process generally takes place more slowly in small wounds than in large, because in the former the caustic action of the spark is more concentrated and the

[1] *Arch. d'elec. méd.*, July 25th, 1909.

application probably too long. He disagrees with Tuffier's statement that the transformation of tissue only takes place for a depth of 1 or 2 mm., and casts doubt upon the observer's histological methods. The third part of the paper is a catalogue of cases and results. He does not favour the method in cancers of the uterus and the tongue, which, he states, represent a considerable proportion of the unsuccessful cases in the lists of other workers. His own results in 95 cases of various cancers may be summarized as follows: Success certain in 28; success apparently fair in 7; death during or following operation in 9. In 10 cases no benefit was observed, and 41 are eliminated—(1) because perfectly operable (which would make the statistics appear too favourable), or (2) because too recently treated, or (3) because the cases were not thoroughly followed up.

THE ENDOWMENT OF THE PASTEUR INSTITUTE.

THE Pasteur Institute, Paris, will shortly come into possession of a capital sum estimated at 30,000,000 francs (£1,200,000), the product of the estate of the late M. Osiris, which is now being realized. The circumstances under which M. Osiris determined to dispose of his great fortune in this way are, if rumour speaks true, most striking and dramatic. In 1903 M. Osiris founded a triennial prize of £4,000, to be given to "the "person who had rendered the greatest service to the "human race during the three preceding years." The prize was awarded to Dr. Roux, Director of the Pasteur Institute, for the discovery of the antidiphtheria serum. Instead of devoting the money to his own private purposes Dr. Roux made over the sum to the Pasteur Institute. This self-denying action so impressed the millionaire that he left the bulk of his fortune to the Institute as a token of admiration for the scientific attainments and self-abnegation of Dr. Roux. M. Osiris could not have made a better disposition of his wealth; the Pasteur Institute is greatly in need of funds, and this endowment will firmly establish it as a monument worthy of the great master. The memory of M. Osiris as a benefactor of the human race is effectively perpetuated by this princely munificence, and the scope and influence of the valuable work of the Pasteur Institute will be vastly increased.

SANATORIUM TREATMENT AND INSURANCE AGAINST TUBERCULOSIS.

IN the August number of *Tuberculosis*, the official journal of the International Antituberculosis Association, Dr. Max Bollag gives particulars of a scheme of insurance against tuberculosis which has been in operation for the past eight years in the Canton of Basle (Switzerland). Some twenty-six societies (sick clubs), comprising a total membership of 4,334 persons have combined in this undertaking, which has been, attended with very gratifying success. Every member pays an annual sum of 40 centimes (4d.) in addition to his ordinary club subscription, and on this it has been found possible to provide sanatorium treatment for all who become consumptive. In addition to his sick pay of about 2 francs a day, the consumptive receives a further 2 francs a day for four months, which pays for his stay in a sanatorium. The proportion of consumptives so assisted each year, as compared with the total number of members, has been about 2 per 1,000. Switzerland is favourably situated in this matter, since sanatorium accommodation is less costly there than in this country. Nevertheless, such a scheme of insurance might be carried out here by friendly societies, though the additional subscription would probably have to be more like 2s. 6d. a year than the small sum which suffices in the Basle Association. As to the effect of sanatorium treatment from the economic point of view, Dr. Stauffer at the end of ten years' working of the people's sanatorium in the district of Altena, has attempted in the same periodical to gauge the success of treatment and the permanence of cure by obtaining, as far as possible, information as to all patients who have undergone treatment at the institution since its foundation. The carefully prepared statistics which he publishes show that half of the patients under treatment ten years ago (1898) have since died. The proportion of deaths gradually diminishes as the date of residence becomes less remote; thus of those treated in 1902, 22.6 per cent. have died, and of the patients in residence in 1906 only 10.5 per cent. are dead. Dr. Stauffer has classified the cases in which tubercle bacilli were found in the sputum separately, and has compared the results with those of the whole number of patients for each year. Taking the presence of bacilli to indicate the more advanced cases, we are prepared to find that the mortality in these cases is much in excess of that for all classes. So also the disappearance of bacilli from the sputum during treatment may be an indication of improvement, if not of arrest in the disease centre; cases in which this event has occurred show a smaller mortality than that of the other "open" cases where bacilli continue to be found in the sputum. The results are precisely what might have been anticipated, but it is useful to have these figures to demonstrate statistically what is the common experience of all who treat consumptives.

POLAR EXPEDITIONS.

SUCCESS in Polar enterprises has, of course, no greater import for the medical profession than for any other body of men, but in the expeditions themselves medicine can rightly claim to have a particular interest. Not a few of the most renowned travellers have been medical men first and explorers afterwards, and to the membership of all organized exploring parties medicine probably contributes more constantly than any other profession. Commonly there are two medical members—one to perform more or less ordinary medical work, the other in charge of scientific observations. Furthermore, every expedition adds something to the sum of medical knowledge of the behaviour of the human frame under unusual conditions, and more than one expedition has thrown useful light on important points of dietetics. As for the Polar expeditions whose success has been announced during the past ten days, their special interest for the medical profession is indubitable. While one, if not two, medical men certainly accompanied Commander Peary, the hero of the other party, Dr. Cook, is the son of a medical man, and himself graduated in the medical faculty of Columbia, New York, some eighteen years ago. There appears still to be some doubt as to whether the honour of being the first to reach the Pole will eventually be awarded to him; but it may be hoped that his claim will finally be established. Meantime it must be admitted that the wording of the announcement of his discovery was somewhat unhappily chosen, more particularly in one passage which, so far as we are aware, has escaped general observation. In his description of the conditions which he found on reaching longitude 86 deg. 38 min., latitude 84 deg. 47 min., he said: "We now found our-"selves beyond the range of all life—neither foot-"prints of bears nor the blow-holes of seals were "detected. Even the microscopic creatures of the "deep were no longer under us." The last twelve words are well calculated to arrest attention, for Dr. Cook and his two Esquimaux companions were then travelling over a frozen sea, and it scarcely seems likely that in the midst of so many other difficulties of vital importance they should have taken the trouble to

bore through the great thickness of ice under their feet to obtain a specimen of sea water and submit it to examination; nor, if obtained, is it easy to imagine means by which its freedom from microscopic organisms could, in the circumstances, have been adequately tested. In the intensely low temperature prevailing, a tiny quantity of water such as that used either for microscopic examination or for a rough test by centrifugalization, would freeze instantaneously. Of course, Dr. Cook may have found some way of getting over the difficulties indicated, and, for all we know, the statement may represent the actual state of affairs in the water near the North Pole, but remembering that the difficulty in question is very obvious, and that a record of the microscopic contents of the water was not essential to his narrative, one might have expected him to make some reference at least to the fashion in which he reached his conclusion. As it stands the unexplained passage suggests something of the nature of poetical licence. In narrating such a remarkable feat as the discovery of the North Pole a departure from strict prose is perfectly comprehensible, but, when occurring in the report of a scientific worker, must inevitably tend to create an unfavourable impression as to the probable accuracy of the rest of his observations.

INTERNATIONAL DENTAL CONGRESS, BERLIN.

THE German Government generously placed the house of the Reichstag in Berlin at the disposal of the Fifth International Dental Congress, Berlin, and the President, Professor Walkhoff of Munich, welcomed the congressists, to the number of 1,600, in the Chamber of Deputies; he communicated to them the gracious message from His Majesty the Kaiser wishing success to the meeting. Various speeches were made by the International delegates, that for Great Britain by the President of the British Dental Association, Mr. H. R. F. Brooks. The real work of the congress was then commenced in the twelve sections set apart for it. Some difficulties were experienced by English speakers owing to the absence of interpreters and stenographers. Mr. J. H. Mummery, London, delivered, at a special meeting, an address and criticisms on the work of the late Professor Miller on dental caries. A leading feature of the congress was the admirable collection of specimens of pathological and scientific dental work organized by Professor Dieck of Berlin, to whom was awarded the Medal of Honour presented by the German Government. Amongst various festivities was that given by the Burgomaster and Municipality of Berlin at the Rathaus, which was a great success. At the concluding meeting the permanent or organizing bureau of dental congresses, known as the International Dental Federation, was reconstituted, Mr. W. B. Paterson, London, being elected its President. An invitation to hold the Sixth International Dental Congress in London, in 1914, was accepted with enthusiasm.

CHOLERA IN HOLLAND.

THE sanitary authorities in Holland seem to have got the outbreak of cholera which occurred there at the end of August well in hand. Most of the cases have occurred in the port of Rotterdam, but a few real cases, and a few others of a suspicious character, have been notified at Amsterdam, Breda, Utrecht, Gorinchem, Vlaardingen, Tolen, and Hoogvliet. The Local Government Board in England has issued a circular to port sanitary authorities and certain riparian sanitary authorities calling attention to the fact that the epidemic of cholera in northern Russia, particularly in the St. Petersburg district and at Archangel, Cronstadt, Riga, and other Baltic ports, has extended to Holland, and requesting the sanitary authorities of British ports trading with Rotterdam or north Russian ports to be on their guard against the importation of cholera into their districts. The Board refers to the revised general order relating to cholera, yellow fever, and plague on ships arriving from foreign ports issued on September 9th, 1907, and points out that the statement which the Board issues weekly to medical officers of health of port and riparian sanitary authorities contains information as to such cholera occurrences as come under its notice. In Russia the disease appears to be claiming about 25 victims daily; the total, so far, for this year is nearly 6,000. Preventive inoculation has been applied to over 53,000 persons, and of these only 12 contracted the disease and only 4 died. In St. Petersburg the continuance of the disease is attributed to the inefficient filtration of drinking water, and the city council has resolved to construct additional filters. In Holland the cases which have occurred number over 20, with 14 deaths, and are attributed to the drinking of unfiltered river water.

THE HOUSING AND TOWN PLANNING BILL.

ON another page will be found an abstract of the discussion of this bill in its Committee stage, and before another issue the final stages of the bill in the Commons will have been passed. The disappointment felt in many quarters at the omission of Clause 30, which provided for a quinquennial survey and register of all small houses, has found expression in an attempt to renew the struggle, and with this object the clause has been put down again for consideration on report on Friday. As both the report stage and the third reading have to be finished on that day by 5 o'clock under the Closure rule, which was passed to expedite the passage of the bill, it is most probable that the clause will not be considered, and certainly no effective debate can take place. When the bill has passed its third reading it will be sent to the Lords, and may even get a first reading there on Friday evening, and pass its other stages in the course of next week, as it is not likely to be unfavourably received in the Upper House. The question of security of tenure for medical officers of health for boroughs and districts has not been lost sight of, as a new clause to provide for this has been put on the notice paper by Mr. Keir Hardie, Mr. Summerbell, and Sir Walter Foster. Under the Closure conditions, it is practically impossible for it to be reached in the Commons, but it would be a most useful piece of work if the matter could be considered and discussed in the Lords when the Committee stage is reached there. The comparatively slow progress being made with the Finance Bill this week, and the fact that next week only two days will be given to that measure in the Commons, while three days will be given to the Irish Land Bill, indicate that there will be plenty of time for the Lords to consider the Housing Bill before they have to deal with the Budget or the Land Bill.

WE have to record with great regret the death on September 8th of Dr. Thomas Bridgwater, who was President of the Council of the British Medical Association from 1887 to 1889. Dr. Bridgwater, who entered the profession in 1847 and graduated M.B.Lond. in 1852, practised for many years at Harrow. He retired some time ago to Hoote Hall, Uckfield, and it was there that his death took place.

Medical Notes in Parliament.

The Housing Bill came on for its Committee stage in the House of Commons on August 30th, and occupied that and the following day. As this stage was taken under a closure resolution, which limited the time for discussion, the debate lacked much of the interest it would otherwise have excited. All the instructions, instructions, including that which Sir Walter Foster had put down to extend the scope of the bill so as to include borough and district medical officers of health, were ruled out of order. On the first clause, which makes Part III of the Housing Act, 1890, operative without adoption by the local authority, a warm discussion arose. Sir F. Banbury opposed it on the ground that it cast doubt on the ability of the local authority to decide what was good for the locality, and because it conferred arbitrary powers on the Local Government Board. He objected to making the President of the Local Government Board a kind of Caesar to coerce and control the work of poorer localities. He also argued against the power given to four residents to demand an inquiry into the housing conditions in their district. Mr. Walter Guinness also spoke against the clause as setting up a central bureaucracy. Sir F. Powell supported the clause as a step in advance for public health, and pointed out that it was carried in the Standing Committee by a unanimous vote. Mr. Burns, in his reply, defended the clause, which allowed 671 rural district councils to cut themselves free from the shackles of the county councils, and enabled them to include housing in their ordinary sanitary duties. A rural council ought to have this power, after four complainants had made their representation to the Local Government Board, without any restraint from the county council and subject only to the approval of the Local Government Board. Under the old law only nine district councils had been able to put housing schemes into operation, and he contended that there were ample safeguards against any unwise or arbitrary action. Lord Morpeth pointed out that this clause depended largely on Clause 10, which had not been discussed, and could not be discussed under the closure procedure. He disliked the coercion given to the central authority, and opined that the bill would be found largely inoperative. After several other members had spoken the clause was passed by 132 to 19. After this the Committee discussed the clause dealing with the acquisition of land, and so occupied the time till the closure came on at 7.30, when the other clauses up to 29 were added to the bill after a number of divisions. On Clause 30 the principal debate was raised. This clause provided for a quinquennial survey, and register for housing purposes, and was regarded by many as the most effective way of securing progress under the bill when passed. Mr. Cave moved the omission of Subsection I, which contained the essence of the clause. He objected to the proposal as unnecessary, inquisitorial, and expensive. Sir F. Powell pointed out that the clause was added to the bill in the Standing Committee in opposition to the Government. He argued against it as unnecessary in face of the inspection now made by the health officials. Mr. A. C. Morton and Mr. Scott also opposed the clause, and then Mr. Morrell supported it. He urged that if the inspection is made now, the extra expense complained of would not be incurred, but if it was not made, this clause would ensure proper inspection in the future. All the arguments against the proposal had been used against factory legislation, but the reasons in this case were stronger than those in favour of the Factory Acts, because it proposed to help people who were powerless to help themselves. The rejection of this part of the bill would be the loss of the most valuable and practical portion. In Paris a more elaborate register had been in force for fifteen years, and he did not think it would have been continued if it had been found so expensive as some thought. His experience in connexion with the Rural Housing Association was that not only inspection but publicity, such as this clause secured, was necessary to improve housing. Mr. Newman Rogers, in supporting the clause, said we should not forget that it was strongly recommended by the Select Committee on Housing, that it was very strongly urged by the Royal Commission on Labour, over which the Duke of Devonshire presided, and that it had, he believed, the almost unanimous approval of every private association and every private individual who had studied the housing question and taken part in the work of pressing it upon the attention of the House. He gave his own personal experience of the value of a census as proposed, and which had been carried out in his county. He was perfectly certain that a large number of the evils that flowed from bad sanitation and overcrowding could be stopped before they occurred if only the rural sanitary authority, or whatever the authority might be, were really in possession of the facts of the case; and by that means he believed that a very great improvement could be secured in the sanitary condition of town and country. With regard to the cost of the inspection, he knew that in some rural districts and urban districts where it had been carried out it was costing very little more than the actual cost of the books in which the register was made. In the case of which he had spoken, the inspection was carried out in under eighteen months by the sanitary officer himself, and by nobody else, and he believed that the period of five years allowed to every authority before the register was to be completed would enable the whole work to be carried out with very little more expense than was represented by the salaries of the existing staff. After speeches from Lord Morpeth, Mr. Lever, and Mr. Pretyman, Mr. Burns spoke strongly against the clause as not being necessary to the bill, which contained very drastic provisions for dealing with defaulting authorities who neglected their duty under the existing law. Secondly, it simplified and strengthened the present law as to the closing and demolition of insanitary cottages, in doing which, in his opinion, we had better spend money rather than waste it upon quinquennial surveys and providing surplus sanitary inspectors with jobs which might be doing themselves some good, but from which the community profited little. Thirdly, houses were to be kept reasonably fit for human habitation. The bill appointed a medical officer for every county, who was to devote the whole of his time to this work; it insisted that every local authority should have a public health and housing committee; it insisted on an interchange of medical officers' reports between the officers with the county council and the Local Government Board. It also gave the Local Government Board further powers than it now enjoyed of requiring a local authority to report on its area with particulars as directed, without foregoing the power the Board now possessed of specially sending down its own inspectors to see that local authorities carried out their duties; and it insisted upon officers giving special reports upon special areas. He believed that the general outcome of the working of the bill, with the ten or twelve additional powers to rectify existing defects, to stimulate lax local authorities, and to screw up the level of sanitary operations and inspections, would do more for the people in rural areas in one year than twenty quinquennial surveys would do in the following century. The clause was not supported, as far as he could gather, by local authorities, by medical officers of health, or by sanitary inspectors, who, to their credit, were continually asking for increased powers to expand their duties, but who were against this clause. It was objected to also by the Municipal Corporations Association, the Urban District Councils Association, the Rural District Councils Association, the Surveyors' Institute, and a number of authorities which he need not mention. They objected to it because it was inquisitorial in its character, extravagant in cost, and useless in practical results. First, he would deal with the cost. There was very useful experience to guide us. Applying the test of the experience of the

Manchester and Liverpool surveys over smaller areas—about 83 acres in each case—it would want 3,352 persons to do the survey in one year, or 40,000 to do it in a month, as it ought to be done; and it was estimated that the total cost for England and Wales would be nearly £500,000. Next as to the register, which if adopted would be an elaborate Domesday Book of the smaller class of dwellings throughout the country—£40 a year in London, £26 in boroughs of 50,000 inhabitants, and elsewhere not exceeding £16. That meant that there would be at least 3,286,000 tenements of less than five rooms to be surveyed and inspected—672,000 in London, 934,000 in county boroughs, 985,000 in urban districts, and 695,000 in rural districts. He was surprised that Paris had been quoted. If there was one city in the world that we ought to avoid in this particular matter it was Paris. What was the test of good sanitary inspection and of good sanitary conditions? It was the absence of consumption. What was the evidence of good sanitary inspection? It was a low death-rate. Let us grapple with that. He would take Paris, with this survey alleged to cost only £2,500. It was a ridiculous estimate to give, and ignored the fact that outside of those who were engaged upon this very elementary register, beyond those costing £2,500, Paris had 3,171 officers on insanitary and insecure buildings in the City itself, besides 4,488 in the Department of the Seine. What was the result? With all this survey, in existence for fifteen years, the facts were these: Where two people died from consumption in London, 3 died in Berlin, and 5 to 6 in Paris. Take the percentages. He had them here in the Report of the Chief Medical Officer. The percentage was 1.65 in London, 2.4 in Berlin, and 3.65 in Paris. Go from consumption and take the general death-rate. In Paris the general death-rate, as a rule, ranged from 18 to 20. At this moment the death-rate in London, a town twice the size of Paris, was 13.8—from 20 to 30 per cent. lower than Paris. Whether you took the general death-rate or that from tuberculosis, there was no justification, in fact or by comparison, between London without its survey and Paris with it. A drastic sanitary inspection was provided by the bill. The survey proposed by the clause did not provide it, but created an army of officials, without any corresponding good. The Committee ought not to be asked to support a ridiculous clause of this kind. The bill provided a cheaper, better, and more practical process for effective sanitary inspection than Clause 30, and he therefore asked the Committee to reject the clause. The Committee divided under the closure and Clause 30 was rejected by 121 to 75. Mr. Burns then carried, after a division, some amendments in Clause 44 relating to back-to-back houses, and then the clauses up to No. 52 were added to the bill. On the second day of the committee stage the town planning clauses were discussed, chiefly with reference to the preparation of schemes under Clause 53, and with reference to compensation to persons whose property might be affected by town planning schemes under Clause 57. Then the closure came into force, and the remaining clauses, the new clauses, and schedules were added to the bill.

Feeble-minded and Epileptics.—Colonel Long asked the President of the Local Government Board whether, pending legislation dealing with the care of the feeble-minded and epileptics, he would decline to sanction any new Poor Law buildings for the accommodation of such cases, or the establishment of any new combinations of Poor Law unions or other local authorities with a view to dealing with such cases, until it was decided by legislation whether Recommendation XXVIII of the Royal Commission on the Care and Control of the Feeble-minded (England and Wales) should become law. Mr. Burns replied that if any proposal of the kind referred to in the question was made he would bear in mind the recommendation made by the Royal Commission; but he did not think he could properly undertake that, pending legislation, he would in no case sanction the provision of new buildings for persons of the class mentioned or the establishment of new combinations for the purpose of dealing with them.

Quack Medicines.—Captain Craig asked the Home Secretary whether his attention had been called to the increase in recent years of the sale of quack medicines; whether he was aware that it had been proved that such nostrums frequently contained nothing but harmless drugs, coloured grease, coloured water, small quantities of aloes, pilules of sugar, etc., though advertised to cure a multitude of different maladies; whether he was aware that the chief cost of such quack medicines was in the advertising; and whether he would appoint a small Commission to inquire into and report upon the whole subject. Mr. Gladstone replied that he begged to refer to the answer on this subject which he gave to the hon. member for North Lambeth on March 12th last. He understood that inquiries were being made, at the instance of the Lord President of the Council, as to whether the practice of medicine by unqualified persons was extending, and as to the effects produced by such practice. These inquiries would, no doubt, throw some light on the question of the use of quack medicines, and he thought it would be advisable to await their result.

Communication of Tuberculosis in Schools.—Mr. C. H. Lyell asked the Lord Advocate whether his attention had been called to the giving of instruction in singing and other subjects to children in Kirriemuir by a teacher suffering from tuberculosis; and whether, in view of the danger of tuberculosis being communicated to the children, the Scottish Education Department was prepared to take any action in the matter. The Lord Advocate replied that the department had no official knowledge of the circumstances referred to, but in any case the matter was one which was entirely within the province of the school board to deal with either on their own motion or at the instance of the public health authority of the district.

Scarlet Fever and its Causes.—Last week Mr. Rupert Guinness asked the President of the Local Government Board whether he was yet in a position to arrive at a decision relative to the resolution of the managers of the Metropolitan Asylums District asking for an inquiry to be made into the causes of scarlet fever and the further means which might be adopted for its prevention in view of the prevalence of the disease. Mr. Burns replied that the medical officer of the Board was preparing a memorandum on the subject of scarlet fever, the sources of infection from this disease, and the measures which could be taken for preventing its spread. He proposed to postpone the further consideration of the question of an inquiry until he had received this memorandum.

Pottery Lead Glaze Analyses.—In reply to Sir Charles Dilke, Mr. Gladstone said that no rule had been laid down as to the number of samples to be sent for analysis, and it necessarily varied from year to year. In 1906–7 only six or seven samples were sent; in 1907–8 the number was 97 (including samples of glazed pottery); and in 1908–9 it was 26. In the five months since March 31st last 47 samples had been taken for analysis. When the Lead Committee had reported it might perhaps be possible to lay down some rule as to how many samples should be taken, but it was obviously desirable that it should be done at uncertain intervals and not at stated times.

Lady Telegraphists and Muscular Cramp.—Mr. J. P. Farrell asked the Postmaster-General whether, in the case of a lady telegraphist who had contracted muscular disease of the arm in consequence of her occupation, he would consider the advisability of arranging for her transfer to some other department requiring less manual effort instead of being removed from the service. Mr. Buxton replied that if, when such a case arose, the officer in question desired to make any representation to him on the subject, he would, of course, gladly consider it. He would be glad to look into any case forwarded to him.

Compensation for the Slaughter of Tuberculous Cows.—Mr. Field asked the representative of the Board of Agriculture whether tuberculosis was included in the diseases scheduled in the Contagious Diseases (Animals) Act; whether he could state under what section of the Contagious Diseases (Animals) Act or amendments thereof the Board had power to call upon local authorities to provide compensation for slaughtered tuberculous cows; and whether it was still proposed to issue the Tuberculosis Order of 1909, having regard to the fact that the Milk and Dairies Bill had been abandoned. Sir E. Strachey replied that tuberculosis was not one of the diseases specifically mentioned in the Diseases of Animals Act, 1894, but the Board had power under Section 22 (xxxv) of that Act to extend the definition of disease, and under Section 19 they might direct that animals might be slaughtered and compensation paid for them by local authorities out of the local rates. The reply to the last part of the question was in the negative, but the question of the postponement of its operation was under consideration.

Chinese Pork.—In reply to Mr. A. Fell, Mr. Burns said that a small proportion only of the consignment of Chinese pigs had been examined at present, as the examination was only made as the carcasses were required for trade purposes. As yet no report had been presented by the Medical Officer of Health for the City on the subject, and the time had not yet arrived when a general report could be made. In answer to a further question, he said that not many tons had been passed into consumption. They were all in cold storage. There were two officers engaged on special examination on behalf of the board itself, and the chief medical officer of the port sanitary authority with his staff were giving special attention to this matter. The Merchandise Marks Act would not apply, and the pork would, like all pork, be sold as pork. If it was good it would go into consumption, if bad the officers would condemn it. The examination of the pigs was carried out in the ordinary course of meat inspection made under the Public Health (Foreign Meat) Regulations, 1908, by officers who were appointed and paid by the City Corporation. The charge for the storage of the carcasses pending examination fell upon the importers. Mr. Fell then elicited from the Secretary to the Board of Trade that a single consignment of frozen pork had been imported from China at the end of July which amounted to 6,020 cwts., valued at £11,238.

Vaccine Lymph Production.—In reply to Mr. Lupton, Mr. Burns said that, as he had stated in reply to a question on June 22nd, each calf used in the Vaccine Establishment was slaughtered as soon as practicable after its removal by the owner, and a *post-mortem* examination was made, at which a veterinary surgeon engaged for the purpose was present. He made a careful examination of the carcass and of the viscera in order to ascertain whether the calf was in perfect health, and immediately afterwards sent in a certificate as to its healthiness or otherwise.

Deaths from Suicide.—Mr. Wardle asked the Home Secretary whether any statistics existed of the number of deaths from suicide; whether he could give the figures for each of the last five years; whether the statistics were classified according to the manner of death; and, if so, could he give particulars. Mr. Gladstone said that the number of verdicts of suicide returned by coroners' juries in each of the five years, 1903 to 1907, was as follows:

1903	3,480
1904	3,327
1905	3,515
1906	3,434
1907	3,477

The figures for 1908 were not yet available. The returns made to the Home Office did not disclose the manner of death, but the information was furnished by the Registrar-General in his annual report (see report for 1907, page 438).

England and Wales.

[From Our Special Correspondents.]

NORFOLK.

The Norfolk and Norwich Hospital.

Although the Norfolk and Norwich Hospital at Norwich, which was founded in 1771, was entirely rebuilt on the most up-to-date principles only twenty-six years ago, yet, owing to the large increase of work that it is now called upon to do as compared with what was required of it at that time, the governors have found it necessary to make some very extensive alterations and additions to the building if it is to be kept abreast of latter-day methods in the treatment of disease. As an example of how the work has increased, and of the extension of the field of modern surgery in recent years, it will be found, on referring to previous reports, that whereas in 1886 the total number of operations performed was under 130, they have gradually increased year by year, until, in 1908, they numbered 1,698. This increase has been altogether out of proportion to the increase in the number of patients admitted during the same period. In all other departments, also, there appears to have been a similar, though perhaps less marked, increase in the work done.

The governors have just issued an appeal for £50,000 to carry out their scheme, which has the entire approval of the staff. This is a large sum of money to raise, but the appeal is floated with a preliminary list of subscriptions amounting to over £12,000. His Majesty the King has always taken special interest in what might be said to be his own county hospital, and he has now shown his practical sympathy with, and approval of, the proposed extensions by heading the subscription list with a donation of 250 guineas. The scheme has the merit of being partly an endowment scheme—that is to say, for every pound spent on bricks and mortar a similar sum will be added to the permanent endowment fund. Further, it is split up into sections, so that the different parts of it can be carried out as the money is forthcoming.

The most urgent needs are a new isolation block for cases of infectious diseases occurring among the inmates, and a separate building for the isolation of septic surgical cases. These are to be built on the "plate-glass separate system," and will be commenced almost immediately with the money already in hand. Provision is made for two new operating theatres in place of the single existing theatre, and there are to be extensive alterations to the casualty and out-patient departments. The hospital is already provided with a well-equipped *x*-ray and electro-therapeutic department, which was fitted up by the chairman of the present appeal committee, Mr. Gurney. Further accommodation for the nursing staff has become necessary, and this can be obtained by adding to the nursing home built and endowed by the late Earl of Leicester, to whom the hospital owed so much. Provision for a new kitchen also comes within the scheme.

The King has promised to lay the foundation stone of the extensions to the hospital on October 25th, and there is one feature in the scheme which we think must be particularly pleasing to His Majesty; that is the amalgamation of the old Norfolk and Norwich Eye Infirmary with the County Hospital. For a century or more these two medical charities have existed as separate and independent institutions in Norwich. Owing principally to the foresight of the late Mr. Cadge and of Sir Peter Eade, who, we are pleased to hear, still takes an active interest in the hospital, though now in his 85th year, the grounds of the institution (in all, seven acres) are ample for the erection of the proposed new buildings, and a very suitable site has been selected for the erection of an ophthalmic block containing 20 beds, which experience shows to be sufficient for the needs of the district. We congratulate the governors of these two institutions upon the amicable amalgamation that they have effected, and wish the present appeal every success.

MANCHESTER AND DISTRICT.

THE SALFORD BOARD OF GUARDIANS AND THE MEDICAL PROFESSION.

UNTIL recently individual medical men in Salford have had to fight their own battles when they came into collision with municipal or Poor Law authorities. Fortunately, however, the Salford Board of Guardians is finding that it has now to reckon with the British Medical Association in dealing with matters that concern the profession. The Salford Guardians have made themselves quite notorious during the past two years, as they afforded the Central Midwives Board, when it presented its petition to the Privy Council for an amendment of the Midwives Act, a fine example of how to make the Act a failure.

About three years ago some serious charges were made against the management of the Salford Union Infirmary known as Hope Hospital, and the Local Government Board thought it necessary to make a full investigation. The number of in-patients at Hope Hospital averages about 800, and to look after these there are two resident medical officers, with a visiting surgeon as superintendent who spends about an hour and a half daily at the hospital. In his absence there was no one in supreme control, as the senior resident medical officer had practically no control even of the medical administration. The Local Government Board inspectors, Mr. Jenner Fust and Dr. A. Fuller, reported that many of the charges were well founded, and they recommended that, "without interfering with the position and duties of the visiting medical officer, there should be entrusted to the senior resident medical officer the modified duties of a medical superintendent, and that he should be placed in control of the medical administration and of the male attendants, etc."

The guardians were evidently much annoyed at the report, but the scandals raised by the charges had so roused public opinion that they acted as they were advised. The salary of the senior resident medical officer was raised from £150 without rations to £200, and then to £220 without rations, and he was entrusted with the modified duties of medical superintendent. This arrangement worked well, and the guardians have been complimented recently on the improvements during the last three years. A new party, however, among the guardians has recently obtained a majority, and an intimation was given to the senior resident medical officer that when his annual term ended on August 30th he would not be reappointed. No reasons for this could be obtained, but some serious insinuations were made, which found their way into the public press, that "it would be better for him and for the hospital that he should go," and "he might be damaged if reasons were given." At the same time the guardians decided to advertise for a successor, offering only £150 salary without rations. This involved one of two things—either a return to the old condition of affairs condemned by the Local Government Board inspectors, in which the senior resident medical officer had no control of the medical administration, or else it meant that the guardians wanted to get a medical officer at a lower salary to do all that the senior resident had been doing. In either case the proposal was not one that commended itself to some of the guardians, and certainly not to the medical profession.

Some further facts also made it necessary that the profession should take a definite stand. For some years past the class of persons elected as guardians has been steadily deteriorating. It is an unfortunate fact that very little interest is taken in Salford in the guardians' election. So small is the proportion of voters who actually vote that any clique that does a little canvassing and shows the least energy at an election can be sure of being elected. With few exceptions, the persons elected are fitted neither by education nor training for the responsible duties of guardians. They will spend hundreds or thousands of pounds after the most cursory discussion, while a great part of a meeting has been taken up on a discussion about employing a rat-catcher. It was not altogether a surprise that a number of these persons developed a tendency to make discourteous and even insulting remarks about the medical officers, which found their way into the public press. Individual guardians even interfered and took the side of patients who complained about diet or medicines ordered by the medical officers. Again, most of the guardians claim and freely exercise the right to grant passes to friends of patients to visit the wards any time on every day of the week, including Sunday. It was in vain the medical officer complained that the wards could not be kept quiet, that a constant stream of visitors seriously interfered with the medical work, and that visits should be on fixed days, except for urgent cases. His expostulations were only met with defiance and almost with insults, and a system of petty interference undermined the influence of the medical men with the patients. In a moment when they felt a wholesome dread of public opinion the guardians had entrusted the senior resident medical officer with modified duties as superintendent of the medical administration, and they found that this had somewhat baffled them in their meddling propensities. Hence their resolution to revert to the old state of things condemned by the Local Government Board inspectors.

In addition, it has been known for years—the guardians themselves knew it quite well—that the hospital is much understaffed with medical men. Two resident medical officers cannot do themselves justice when they are responsible for 800 to 900 patients. Dr. McVail, in his report to the Poor Law Commission, specially mentioned Hope Hospital as being understaffed, and said that the work "is bound to be rushed to be overtaken." The idea of "rushing" medical work on which the health and the lives of poor patients depend surely ought to have appealed to the most ignorant of guardians as being a disgraceful state of affairs, even if they cared nothing at all about the sweating of the doctors. But so far was it from affecting the Salford Guardians that they actually determined, not long after Dr. McVail's report was published, to take away those powers of the senior resident medical officer which gave him an opportunity of properly carrying out his work, and in addition to advertise for another doctor in his place at a salary of £70 a year less.

Then it was that the Salford Division of the British Medical Association thought it high time to interfere. The advertisement was refused by the BRITISH MEDICAL JOURNAL, a "warning notice" was inserted, and the Division decided to advise intending applicants that it was not to the advantage of any medical man to accept the post of senior resident medical officer at Hope Hospital. Since that decision the Local Government Board inspector (Mr. Lowry) has urged the infirmary committee to consider at an early period the question of increasing the medical staff. When the last day for sending in applications came there was not a single applicant for the post. The senior resident medical officer left on August 31st at the end of his term, while the junior medical officer was away on his holidays. A locumtenent was obtained for a week, to whom 6 guineas had to be paid, and the junior medical officer has now given notice that he will refuse re-election at the end of his year in October. It is quite possible that the guardians may by advertising obtain some medical man who knows nothing of the state of affairs; but, if they willingly leave any candidate in ignorance of the complaints that have been made, they would be guilty of a breach of good faith, so gross as probably to justify any one so appointed in refusing to carry out his agreement, while to carry on the hospital by means of locumtenents can only serve as a temporary expedient. For the position of senior resident medical officer, with the modified duties of medical superintendent, as advised by the Local Government Board, a medical man of experience—not one only just qualified—is absolutely necessary in the interests of the patients, and the least salary that should be accepted is £250. The late senior resident medical officer had determined only to accept reappointment on condition that his sphere was strictly marked out so as to prevent annoying interference in his duties by individual guardians, and this ought to be demanded by any one who succeeds him. In addition there certainly ought to be two junior medical officers instead of one as at present. Whatever the guardians may think of the idea of "rushing" work on which the lives of poor patients depend, the idea does not commend itself to the Salford Division of the British Medical Association. Compared with this, even the intolerable interference by individual guardians and the sweating of the medical men must take a second place.

LONDON.

Health Visitors.

An Act obtained by the London County Council last year empowered any sanitary authority in London to appoint suitable women, to be known as "health visitors," to give advice as to the proper nurture, care, and management of young children and the promotion of cleanliness. The Act required the Local Government Board to make regulations, and the Board has now issued an Order.[1] Article I prescribes that a woman shall be qualified to be a health visitor if she

(*a*) is a duly qualified medical practitioner within the meaning of the Medical Acts; or
(*b*) is qualified for the appointment of nurse by having undergone, for three years at least, a course of instruction in the medical and surgical wards of any hospital or infirmary, being a training school for nurses, and having a resident physician or house-surgeon; or
(*c*) is certified under the Midwives Act, 1902; or
(*d*) has, for a period of not less than six months, undergone in a hospital or infirmary, receiving children as well as adults, and having a resident physician or house-surgeon, a course of instruction including subjects relating to personal hygiene, and holds the certificate of the Royal Sanitary Institute for Health Visitors and School Nurses, or the certificate or diploma of the National Health Society, or of any other body which may from time to time be approved by Us; or
(*e*) has, in the service of a Sanitary Authority, or of the Council of a Borough or of another Urban District or of any other Public Body or Authority in England or Wales, discharged duties which, in Our opinion, are similar to those described in the Act or prescribed by these Regulations in relation to the office of Health Visitor, and produces such evidence as, in Our opinion, suffices to prove her competency.

But power is reserved to the Board to sanction the appointment of a woman who has a competent knowledge and experience of the theory and practice of nurture, of the care and management of young children, of attendance on women in and immediately after childbirth, and of nursing attendance in cases of sickness or other mental and bodily infirmity.

The selection made by the local authority must be approved by the Board, and three months' notice of termination of the appointment may be given either by the health visitor or by the local authority. It will be the duty of the health visitor to carry out the following regulations:

1. The Health Visitor shall, in relation to each person visited, enter on a suitable card or in a book to be called "the Health Visitor's Report Book" all such particulars as the Sanitary Authority or the Medical Officer of Health require to be ascertained and recorded, and shall submit the cards or Health Visitor's Report Book to the Sanitary Authority or the Medical Officer of Health so often and at such times as may be required, and, subject to the directions of the Medical Officer of Health, shall keep the cards arranged so that any card may be readily available for reference at any time when the card is not in use for the purpose of a visit.
2. The Health Visitor shall, under the direction of the Medical Officer of Health, discharge such duties, not being duties of a Sanitary Inspector, as may be assigned to her by the Sanitary Authority in connexion with and for the purposes of the administration by the Sanitary Authority of any public and general Act or local and personal Act under which powers are conferred or duties are imposed upon the Sanitary Authority with respect to matters relating to public health, the housing of the working classes, and the notification of births, or of any bylaws or regulations made under any such Act.
3. The Health Visitor shall discharge such duties in substitution for, or in addition to, any duties assigned to her under the paragraph numbered (2) in this Article in connexion with any of the Acts, bylaws, or regulations mentioned in that paragraph, or in connexion with other Acts, bylaws, or regulations as may be prescribed by Us, whether generally, by further regulations made by Us in pursuance of the Act, or, in the case of any particular Health Visitor, by an Instrument issued by Us in that behalf under Our Hand and Seal.
4. The Health Visitor shall observe and execute, in regard to matters not specifically provided for in this Order, any such instruction issued by Us and any such order or direction of the Sanitary Authority or the Medical Officer of Health as may be applicable to her office.

The salary, to be paid by the sanitary authority, must have the approval of the Board, and while recognizing that the salary in any particular case will depend to some extent upon local circumstances, the Board expresses the opinion that, having regard to the important duties to be discharged by the health visitors, and to the salaries paid to female sanitary inspectors in London, the salary should not be less than £100 a year. The Board also considers it desirable that the health visitor should, as a general rule, devote the whole of her time to the duties of her office. In conclusion, the Board states that it attaches much importance to the appointment of health visitors in London, especially in view of the provisions of the Notification of Births Act, 1907, and therefore trusts that sanitary authorities will at once proceed to make such appointments.

[1] London: Wyman and Sons, Limited (or through any bookseller). Order No. 54,044.

Scotland.

[From Our Special Correspondents.]

The Chair of Surgery at Aberdeen.

The King, on the recommendation of the Secretary for Scotland, has approved of the appointment of Mr. John Marnoch, M.A., M.B., C.M., Surgeon to and Lecturer on Clinical Surgery at the Aberdeen Royal Infirmary, to be Regius Professor of Surgery in the University of Aberdeen, in succession to Professor Alexander Ogston, who has resigned as from September 30th. Mr. Marnoch is a native of Aberdeen, and had a most distinguished career as a student of medicine at Aberdeen University, graduating with highest honours in 1891. During the next year or two he held various resident appointments in the Infirmary and Royal Hospital for Sick Children, and in 1893 was appointed Assistant-Surgeon to the Infirmary. For several years he acted as assistant to the Professor of Physiology in the University. In 1900 he was appointed Surgeon in Charge of Wards and Lecturer in Clinical Surgery, and since then has devoted himself entirely to surgical practice, and has made several important contributions to surgical literature. The appointment now made puts an end to a long period of speculation and, one might say, anxiety. It is almost a year since Professor Ogston announced that his resignation would take place at the end of the university year, hoping that his early announcement of the fact would lead to an appointment being made early enough to give his successor sufficient time to prepare for the winter session. His words sound rather ironical now with the opening of the winter session no more than a few weeks distant. It appears, however, that no definite action could be taken until June 1st, and thereafter there seemed some reason to suppose that the Secretary for Scotland contemplated the introduction of an outside man to fill the post, and inquiries were instituted through the Senatus as to whether, in the event of such a one being appointed, wards would be available in the Royal Infirmary. No wards were available, as Professor Ogston so long ago as 1898 resigned his hospital appointment while still retaining the chair, and an appointment was made to his wards at that time. We understand that it has been arranged that in future the occupancy of the chair and the hospital appointment must terminate at the same time, the directors of the infirmary reserving their right of making the appointment to the wards, just as on the medical side in regard to the Professor of Medicine.

The Chair of Anatomy at Glasgow.

The King has approved of the appointment of Mr. Thomas H. Bryce, M.A., M.D., Lecturer in Anatomy in the University of Glasgow, to be Regius Professor of Anatomy in succession to Professor John Cleland, whose resignation takes effect on September 30th. Dr. Bryce received his medical education at Edinburgh and Vienna, graduated M.B., C.M.Edin. in 1886, and proceeded to the degree of M.D. in 1901, when he was awarded the gold medal. Professor Bryce has given special attention to the study of embryology, and is the author of the article on the subject in the last edition of *Quain's Anatomy*. He is also the joint author of a valuable *Study of the Early Development and Embedding of the Human Ovum*.

Gift of a Hospital to Wemyss.

On August 28th the Wemyss Memorial Hospital, given by Lady Eva Wemyss to Wemyss Parish, was formally

handed over to the trustees. The hospital, built in the centre of the parish, which extends for seven miles, and includes East and West Wemyss, Dunbeath, Coalburn, and the burghs of Buckhaven and Duthil, is of old Scottish design, with a clock tower in the centre. It contains two large wards, and also special wards for women and children, operating room, doctors' and nurses' rooms, caretaker's house, chapel and mortuary. It cost about £5,000. It is furnished and equipped according to the latest scientific ideas, and is, in addition, well endowed. The hospital was dedicated to the memory of Randolph Gordon Erskine Wemyss, and to the services of the injured among his fellow men.

Ireland.

[FROM OUR SPECIAL CORRESPONDENTS.]

QUEEN'S COLLEGE, BELFAST.

Last Annual Report.

THE President (Rev. Dr. Hamilton) has presented to Parliament the last annual report by the college, which closes its useful career of nearly sixty years in full strength and vigour; there were 456 students upon the roll, the largest number for nearly twenty years, and the results of the examinations at the Royal University, now also moribund, and elsewhere, give proof that quality has not deteriorated. A noticeable feature in the life of the college during recent years is the large number of women students; 87 attended in 1908–9. The college will now change from its chrysalis stage to the full life of a university, with increased endowment, an increased staff and buildings and the power of granting degrees. The medical school will still form an important part of the new institution.

PUBLIC HEALTH IN BELFAST.

After eleven years of discussions, deputations, motions, amendments, and adjournments, final plans for a new abattoir have at last been adopted by the City Council at the monthly meeting on September 1st. In moving the minutes of the special meeting of council in committee, Councillor Dr. Henry O'Neill, who has all along been very active in the matter, said that the principal features of the improvement were increased accommodation for lairage, the cooling chambers, increased space, and better methods generally.

In the same meeting of the City Council, on the motion of Alderman Dr. King-Kerr, Chairman of the Public Health Committee, it was unanimously resolved to adopt Part I of the Tuberculosis Prevention (Ireland) Act, 1908. The resolution comes into operation on November 1st, 1909.

COMPULSORY NOTIFICATION OF TUBERCULOSIS.

Dr. William Osler, Regius Professor of Medicine at the University of Oxford, has addressed the following letter to the Secretary of the Women's National Health Association:

I am sorry that you are having opposition to the adoption of the compulsory notification of tuberculosis.

As is so often the case, difficulties vanish when squarely faced, and this has been the history of the question in debate. The experience of New York City is overwhelmingly in favour. At first there was opposition on the part of many medical men, partly on the ground that it would cause hardship to the poor, partly lest the well-to-do should be put to any inconvenience. It is universally acknowledged that the Act works smoothly, and with practically no inconvenience. I am assured by the members of the New York Board of Health that no single measure has been so important in the fight against tuberculosis.

That notification will cause loss of employment to a large number of persons is in the highest degree improbable; certainly it has not done so elsewhere.

Slight increase in the rates may follow notification, just as it naturally follows any great public improvement. No doubt typhus and small-pox corresponded with low rates.

Truth is often unpleasant, and in Ireland you are at present suffering from the shock of the realization of what has been known to health authorities for many years.

That working people will hesitate to send for the doctor because of the risks involved in notification applies as little to tuberculosis as it does to typhoid fever or measles, and appears to one to be entirely fanciful.

That there is to be a cruel crushing of the poor working man in notification is a myth—there is no class legislation, as the Act applies to rich and poor alike.

I do wish Dr. M'Walter would go to New York and study the work of his brethren—mostly Irish brethren—in this battle against tuberculosis. The conditions are in some ways quite as bad as in Dublin. He would return a wiser and a gayer man, and I should not be surprised at the next meeting of the British Medical Association to see him down for a paper on the advantages of compulsory notification of tuberculosis in Dublin.

TYPHOID AT ROSCOMMON.

There are several cases of typhoid in the Roscommon Union Hospital which have been sent in from the direction of Mount Talbot. The nurses cost £12 a week. At a meeting of the board of guardians the medical officer was directed to inquire into and report upon the cause of the outbreak, so that a remedy may be applied at once.

South Australia.

MEDICAL INSPECTION OF SCHOOLS.

DR. H. S. ROGERS, who was appointed by the South Australasian Government not long ago to carry out the medical inspection of school children in Adelaide, has (we learn from the *Australasian Medical Gazette*) made some progress with the work, and at the recent inter-State Congress on State Children he reported the results of some of his investigations. He found that from 60 to 70 per cent. of the scholars he had examined suffered from adenoid growths or enlarged tonsils. Grave defects in eyesight were not numerous, and curvature of the spine, which was so prevalent in some other countries, was scarcely seen. He visited first the Observation School in Currie Street, where it was generally accepted that the lowest type of children attended, and it was a pleasure to note that the dirty child was conspicuous by its absence. On inquiry, he found that the teachers had solved the problem themselves by taking those who were unclean and tubbing them in the presence of each other. The knowledge that the children had to be inspected had resulted in closer attention by parents to the clothing and condition of their offspring, and it was pleasing to know that the sense of shame was so easily invoked to the benefit of the child. Much required to be done to secure the proper lighting of schools. In one of the newest schools of the city he found the light in the face of the teacher, and the children sitting in their own light. A more defectively lighted educational room he could scarcely imagine. On the question of dealing with the feeble-minded children, he recommended the appointment of a small board of commissioners who should supersede the official visitors at the asylum, and whose powers could be extended to include that branch of work. The scheme might seem costly in the beginning, but financial saving would be effected in many other ways by the proper training and care of the mentally defective subjects in the community.

Special Correspondence.

VIENNA.

Increasing Consumption of Meat.—Professional Secrecy.—The Jubilee Hospital.

FOR the last few years, the general sale of meat and cereals has been controlled by the local magistrates in co-operation with the market commissioners in Vienna. Down to 1900 the annual consumption fluctuated from year to year, but averaged about 70 kilos (156 lb.) of meat a head of the population; since that time a slow but constant increase has been noted, while cereals have remained stationary; in 1905 the average was about 73 kilos (162 lb.), in 1908 it was 76¼ kilos (170 lb.), and for the first half of 1909, 77 kilos (172 lb.), an increase of 10 per cent. in nine years. The reports of the Bureau of Health have shown a remarkable parallelism, for since 1900 a constant improvement of health and decline in mortality have been recorded. These two facts no doubt indicate increasing national welfare and wealth, and are not in causal connexion with each other, as has been suggested. The increase of industrial concerns in this country, as compared with agricultural occupation, tends to promote the consumption of meat. Pork and beef are used mostly, whilst veal, fowl, and mutton much less; 774,000 pigs

were consumed in 1908, but only 7,500 lambs were sent to the capital. The increased consumption of these kinds of meat has occurred in spite of higher prices. On the assumption that a more carnivorous population in hard-working countries is to be preferred to a more vegetarian one, care has been taken to ensure for the lower working classes ample supplies of meat of all kinds at low prices by the erection of municipal butchers' shops.

The problem of professional secrecy has recently been much discussed in medical circles owing to two forensic cases, in which a marked difference of opinion was displayed both by the court and the profession. The facts, briefly stated, are as follows: A young lady occupied in a post office acquired extragenital syphilis. The physician did not at first make a correct diagnosis, but after prolonged treatment a consultant explained matters. Hereupon the physician warned the patient against continuing her occupation, and, as his advice was disregarded, he informed the superintendent of the post office district, with the result that the patient was put on the sick list and temporarily relieved of her duties. At the same time the inhabitants of the village came to know of the nature of the girl's affection, although it was never proved how the fact leaked out. The patient sued the doctor for damages owing to the breach of professional secrecy committed by him. After repeated hearings the judge dismissed the charge, remarking that the doctor was justified in informing the post-office authorities, as the public welfare was endangered; in the conflict between the duties towards his patient and those towards the public the physician had chosen the safer course. If it had been proved that the inhabitants of the village were informed by the doctor, then damages could have been allowed. A very spirited discussion followed in medical circles, but only a small minority of the members sympathized with the course of action taken by the accused doctor. The personal relations between doctor and patient are still regarded by nearly all physicians as being of the closest and most confidential nature, and under no conditions whatever (except those specially required by law) permit of disclosure of facts thus ascertained. In another case, where two school children had been infected by the father with extragenital syphilis, the physician in charge had communicated with the head master of the school, asking him to exclude the two patients from their classes, as they suffered from a transmissible disease, and the parents disregarded the medical advice to keep the children at home. Here, too, a charge was made against the doctor, and was also dismissed on the same grounds. Since the importance of the social activity of the physician has been recognized efforts have been made to reconcile the requirements of public health with the needs of individual secrecy, and the proposed new medical charter (*Aerzte-ordnung*) will deal extensively with these questions.

The jubilee hospital of the city of Vienna for the destitute only, established in commemoration of the sixtieth anniversary of the Emperor's reign, has already been much discussed, and it is to be regretted that the original plans had to be materially changed. Thus, instead of 1,000 beds, only 700 will be opened, and the accommodation of the open-air halls, originally intended for 300 persons, has been cut down to 120 owing to lack of funds. It becomes more and more evident that the 10,000,000 kronen grant by the municipality was something like a bluff, and, now that work has to be commenced, the true antimedical trend of the men now in power becomes visible. The continued lack of adequate hospital accommodation, the recurring difference of opinion as to whose duty it is to provide the necessary funds—the State's or the municipality's—have led to such a state of things that a radical measure is necessary, and this will be carried out in spite of obsolete opinions of easy-going City Fathers.

THE *Journal of the American Medical Association* states that in July the Board of Health for the State of Montana adopted resolutions abolishing quarantine for small-pox on the ground that vaccination if properly performed and repeated at intervals was an absolute preventive, that the care of cases in quarantine was a very costly task, and that properly vaccinated persons threw no such expense on local authorities.

Correspondence.

THE REPORT OF THE MIDWIVES ACT COMMITTEE.

SIR,—In your leading article of August 28th on the Report of the Midwives Act Committee you express the opinion that "the Committee would have been all the stronger in discussing certain details if it had contained a member fully conversant with general practice." Probably few members of the medical profession will be inclined to disagree with that opinion. Apart, however, from questions relating to the fee to medical men answering the call of midwives in emergencies, to which you referred chiefly, there is another matter in respect of the Committee's recommendations on which the opinion of general practitioners might have had some weight.

In the consideration of the question of the supply and training of midwives the Committee came to the conclusions that "the organization and distribution of the supply should be undertaken by the co-ordinated action of local authorities and voluntary agencies," and they concluded also that "the powers of county councils should be extended so as to enable them to charge upon the county fund contributions in aid of the training of midwives for work in their areas."

Personally, I think that the Committee would have been well advised to have limited their recommendations in this matter to that last-quoted one. It would have been more in agreement with the law of demand and supply. To establish a system of organized midwifery may lead easily to interference with the liberty of the subject and prejudice the rights of practice.

But when the Committee go further and recommend that, for the organization and supply of midwives, there should be "the establishment of county nursing associations throughout the country, working in co-operation with the local supervising authorities, and affiliated, wherever possible, to some central body such as Queen Victoria's Jubilee Institute," they suggest a policy which may have far-reaching consequences. The provision of scholarships by a county council for suitable women, on their own application, to procure training so as to become independent midwives in their county is one thing, but co-operation with a county nursing association for the organization and distribution of the supply of midwives would be quite another one.

The general medical practitioner knows where he is with the independent midwife. He knows that she is a regularized practitioner in midwifery, and, within certain well-defined limits of action, independent of medical assistance; that she is amenable strictly to the law under the Midwives Act; and that she is subject to supervision from the local supervising authority. But organization and distribution of midwives through the co-operation of nursing associations would tend surely to the extinction of the class of independent midwives; and this is rather a large proposition to face. Is midwifery to be combined with district nursing on an organized plan? That would certainly add little to the amenities of general practice. In their own defence, the general medical practitioner and the independent midwife might ask justly also for organization and distribution.

Is the matter not being carried in fact a little too far? Nursing associations, confining themselves to nursing duties, have done most excellent work in the past; to co-opt them in the work of supervision of midwifery practice, however, appears to me to be a proposition which, if not actually unworkable, is calculated to create a monopoly where now there is freedom of choice for the community.—I am, etc.,

Northampton, Aug. 30th. CHARLES E. PAGET.

THE REPORTS OF THE POOR LAW COMMISSIONERS.

SIR,—In his address on the Medical Aspect of the Report of the Royal Commission on Poor Law Reform to the Birmingham Branch of the British Medical Association, as published in the SUPPLEMENT to the JOURNAL of August 21st, Dr. Manley speaks as follows in the course of a kindly reference to my own report to the Commission:

The dispensary doctor would, in his (that is, Dr. McVail's) idea, usurp the functions of the school inspector, the medical

inspector under the Factory Acts, the inspectors of midwives, the health visitors, and even the work done for life insurance. That the intrusion of the profession into the houses of the poor and the regular examination of the working man and his family would be resented, goes without saying.

The reference here is not to any of the series of recommendations in my report, but to an added memorandum on medical provident institutions, in which I take the liberty to go somewhat beyond the subject of Poor Law Medical Relief. I am glad Dr. Manley has noticed the memorandum, but, to prevent misapprehension, please allow me to say that I make no mention whatever of any of the several classes of inspectors, visitors, etc, of whom he speaks. The idea that the functions of these officers would be usurped under such a scheme of medical provident institutions as is adumbrated in the memorandum, is not mine, but must be his own. I do not agree with him, but my purpose is merely to clear away a misunderstanding and not to discuss Dr. Manley's views.

Then, as to the latter part of the above quotation, where intrusion into working men's houses is feared or assumed, and their consequent resentment predicted, the memorandum makes it perfectly plain that membership of such institutions would be entirely voluntary, and that, even amongst members, acceptance of periodical medical examination would also be entirely voluntary. The medical officer would make the offer, but it "would of course be impossible to compel members to submit to such examination. Compulsion would only exist towards the offer of it; any one who chose might refuse to be examined." I cannot see how in these circumstances there would be room for either intrusion or resentment. Dr. Manley condemns my suggestions as "wholly unworkable," but he appears to be under a fundamental misapprehension as to what they really are.

Once more, however, my object is not to argue the matter, but only to correct what seems a misreading of the memorandum, which might readily mislead those who heard or have read Dr. Manley's interesting address, but have not themselves seen my report.—I am, etc.,

Glasgow, Sept. 7th. JOHN C. MCVAIL.

SIR,—Whether or not you have made up your mind that the carrying out of the scheme of the Majority Commissioners would most benefit the medical profession of the country, it is quite clear that Dr. Beckett-Overy is convinced as to the advantage of the Minority scheme. Dr. Beckett-Overy's experience of the working of the resent Poor Law medical system would seem to have been derived from observations when acting as a locumtenent to Poor Law medical officers in his early days, and although such experience may seem to him adequate to enable him to express an opinion as to the value attached by Poor Law medical officers to their appointments, it is by no means certain that the Poor Law medical service will agree with him. I quite agree with Dr. Beckett-Overy's advice to all to read carefully both Reports, especially the Minority, but I cannot help thinking that the medical profession will be more impressed by the views of Poor Law medical officers, and medical men in practice in poor districts, who would be far more affected by the changes contemplated than Dr. Beckett-Overy.

Sir Dyce Duckworth at the annual dinner of the Poor Law Medical Officers' Association admitted the inability of the "Harley Street physician" to understand some of the problems which are matters of life and death to the general practitioner among the poor. That "revolution in the relation of the profession to the community," Sir, which you allude to, would in no way affect the practice of the upper ranks of the profession, but might simply ruin many practitioners holding a humbler position.

Personally, after a careful study of both Reports, I must confess that I am not satisfied with either, but I believe a considerable amelioration of the present system might be obtained by the judicious use of both in reforming and remodelling the existing Poor Law medical service.—I am, etc.,

London, N.E., Aug. 28th. MAJOR GREENWOOD.

SIR,—May I encroach on your valuable space to say, as a Poor Law medical officer, that I trust that all Poor Law medical officers who are thoroughly satisfied with their appointments will say so, in no uncertain tones, when replying to Mrs. Sidney Webb's letter of August 31st?

Speaking on behalf of myself and my three colleagues in this town, I may say our Poor Law medical system here works harmoniously, and our remuneration, although not, perhaps, quite adequate, is not one to grumble at in any way. The guardians provide a central dispensary where all medicines are given out, so that we have no expense of drugs, etc. Were this system adopted in every urban district, I feel sure Poor Law medical officers in towns would be quite satisfied with their appointments. It is in the rural districts where the remuneration is inadequate for the distances that have to be covered and medicines supplied.

The break-up of the Poor Law simply means that thousands of medical men throughout the country will be deprived of what is now a constant and certain part of their income.

In my opinion, hospital abuse is an evil which has a prior claim to be remedied before any break-up of the Poor Law system, at any rate from the medical standpoint.—I am, etc.,

JAS W. KING, M.B,
Medical Officer and Public Vaccinator, No. 2 District
Derby, Sept. 2nd. of the Derby Union.

⁂ The letter referred to by our correspondent is as follows:

THE NATIONAL COMMITTEE TO PROMOTE THE BREAK-UP OF THE POOR LAW.
5 and 6 Clement's Inn, Strand, London, W.C.,
August 31st, 1909.

Dear Sir,—As I did not have the pleasure of meeting you at the Conference of the Poor Law Medical Officers' Association at the Guildhall last month, I venture to send you a copy of the paper read on that occasion. As the Cabinet will have to come to a decision this autumn upon the reorganization of the Poor Law Medical Service the question is one of urgency, and my committee would be much obliged if you would be so good as to send me any criticisms or suggestions upon the subject.

I enclose a few other papers bearing on the general question.

Apologising for troubling you at this season.

I am, dear sir, Yours faithfully,
BEATRICE WEBB (Mrs. Sidney Webb.)

The paper read by Mrs. Sidney Webb at the Conference of the Poor Law Medical Officers' Association was published in the SUPPLEMENT to the BRITISH MEDICAL JOURNAL, July 17th, 1909, p. 88. The other papers mentioned by Mrs. Webb are two leaflets explaining the aims and objects of the National Committee to Promote the Break-up of the Poor Law, of which Prebendary Russell Wakefield, the new Dean of Norwich, is President and Mrs. Webb Honorary Secretary.

WHOLE-TIME MEDICAL OFFICERS OF HEALTH.

SIR,—I do not desire at this time to discuss the many controversial points necessarily raised by the wording of the recent resolution[1] concerning medical officers of health adopted by the Representative Meeting; but I shall be glad if you will allow me space to mention in your columns that there over 1,000 general practitioners in England and Wales alone holding "part-time" appointments. As the whole of these appointments necessarily lapse in the course of four or five years at most, the effect of the resolution, if acted upon, would be to cause a loss to the general practitioners of this country of emoluments totalling about £100,000 a year.—I am, etc.,

Mortlake, S.W., Sept. 6th. F. G. CROOKSHANK, M.D.

THE KINAESTHETIC AREA OF THE BRAIN.

SIR,—I have seen Sir Victor Horsley's letter in the JOURNAL of August 28th, and it seems evident that he still does not realize my point of view. The question raised by me does not concern the meaning of the mere word "kinaesthetic," nor does it matter whether such a word may or may not be fitly applied to certain spinal centres as well as to some centres in the cerebral cortex.

My contention was and is that the so called "motor centres" of the cortex are purely sensory centres for the registration of all the complex impressions resulting from movement, and it was for this reason that I applied the term "kinaesthetic area" to the region of the cortex in question.

Doubtless such impressions must also be registered in some way in the spinal cord, but they would be registered in sensory regions of its grey matter and not in the anterior cornua. These centres in the spinal cord for the reception of afferent impressions are brought into relation with other centres (motor) by means of connecting or

[1] SUPPLEMENT to the BRITISH MEDICAL JOURNAL, July 31st, 1909, p. 153.

internuncial fibres. In common with the majority of physiologists, I assume that we have here to do in such pairs with *two* centres, while Sir Victor Horsley chooses to speak of such an associated couple as though it were *one* centre.

My view, however, is that we not only have to do with two centres, but that the two components of such functional couples do not always or necessarily exist in close proximity with one another. In illustration of this, I say that in the cerebral cortex we have in the kinaesthetic area only a series of sensory centres for the reception of afferent impressions and for the initiation (through what is known as the "will") of all our varied muscular movements; while the nervous mechanisms concerned with the actual performance of these correlated muscular actions (that is, the "motor" sides of the functional couples) are situated, as Sherrington and Beevor have shown, in the bulb and in the spinal cord.

Of course, when impulses pass from sensory centres to motor centres they must pass through certain connecting or internuncial fibres, so that *every sensory centre must be in relation not only with afferent, but also with efferent, fibres.* And if in the great kinaesthetic area there are regions where sensory impulses more especially impinge (as Cushing's observations seem to indicate[1]), so must there also be regions of these same sensory centres whence efferent stimuli emerge, when what William James speaks of as the "fiat" goes forth. My view is that such efferent stimuli pass out, as experimental observations have shown, from the precentral gyrus, and that they traverse the "pyramidal tract" on their way to motor centres in the bulb and in the cord.

There is, therefore, in accordance with my views, no justification for calling the cortical centres in question either "motor" or "sensori-motor." My view may be right or may be wrong, but it must not be assumed to be the same as that of my friend Dr. Hughlings Jackson merely because of my use of the term "kinaesthetic"; nor can I think that these particular sensory centres in the cerebral cortex are any the less worthy of the name of sensory centres simply because their particular emissive fibres pursue a long course and are found to be embodied in the "pyramidal tract."—I am, etc.,

London, W., Aug. 29th. H. CHARLTON BASTIAN.

HAEMODYNAMICS.

SIR,—In the BRITISH MEDICAL JOURNAL of August 28th, p. 551, there is an interesting and commendatory review of the work of Johann Plesch on the above subject. I have not seen the original work, and can therefore only assume that the author's figures and conclusions are correctly transcribed by your reviewer. His determination of the blood volume, haemoglobin content, and oxygen capacity of the blood have been arrived at by Haldane's method, and therefore may be accepted as correct, though even here great care is required, as, when dealing with the multiplication table, slight initial errors often lead to surprising results.

He agrees with Haldane in estimating the blood volume as 5.3 per cent. of the body-weight, the haemoglobin at 0.70 per cent. of the body-weight, and the total oxygen capacity of the blood at 10 c.cm. per kg. of the body-weight. The average minute volume of blood passing through the heart of a man of 70 kg. is set down as 4.31 litres, which, with a heart beating 73 to the minute, gives a heart-beat volume of 59 c.cm.

In some of my papers I have reckoned 60 c.cm. as a fair average volume to be discharged from either ventricle at each stroke. No doubt the number of cardiac beats and the amount discharged at each beat vary greatly, and although with increased frequency the amount per minute may be increased considerably, the amount discharged at each beat is diminished. It is, however, too great a strain on the imagination to accept his statement that "in the greatest work" the amount of blood passing through the heart in a minute may rise from 4.31 to 47.1 litres in a minute. The statement that "the heart-beat volume of 59 c.cm. may rise to 240 c.cm." is equally grotesque. You may get a so-called "bullock's heart" whose left ventricle would hold 240 c.cm. (about 8 oz.), but in a unit of time no more blood can leave the left ventricle through the aorta than that which passes through the right.

[1] *Brain*, 1909, Part 125, p. 44.

"The velocity of flow is 42 cm. per second, and may rise to 200 cm." In a recent paper in the BRITISH MEDICAL JOURNAL I gave examples of the velocity of the blood in the aorta varying from 65 cm. to 245 cm. in the second. I have no doubt the range of velocity is much greater than that, and when the patient comes near life's terminus the velocity may sink much below 42 cm.

"The circulation time is 55 seconds, or 65 pulse beats, and may fall to 4½ seconds in the greatest work." The total weight of blood in a man of 70 kg. at 5.3 per cent. equals 3.71 kg., or, if the specific gravity be reckoned at 1060, then the volume will be 3.5 litres, and this passes through the heart in 55 seconds, or at the rate of 3.82 litres in the minute, but he previously told us that the rate was 4.31 litres per minute. I now ask your readers: Is it conceivable that these 3.82 litres could pass through any human heart under any circumstances in 4½ seconds?

"The work of the heart per minute is in rest 9.27 m.kg., and may rise to 100." I have recently shown that, according to Starling, the work of a normal left ventricle is 102 gram-metres per stroke, which, with a pulse of 70, gives 7.14 kg.m. per minute. According to my own calculation, the work of a similar left ventricle is only 78 gram-metres per stroke, or, with a pulse of 70, the work is 5.46 kg.m. per minute. Before 100 kilogram-metres of work could be got out of a left ventricle beating 70 times in the minute, a discharge of 240 c.cm. at each stroke and a resistence of 450 mm. of mercury would be required. I have never met any "bullock's heart" where such conditions appertain. If your reviewer's figures be correct, I quite agree with him that "it is somewhat astonishing to realize that all these determinations can be arrived at by such simple and harmless means in a normal man," but I cannot agree with him that the "results may be accepted with considerable confidence, as they have been arrived at by exact physiological methods." I am often inclined to think that physiological methods are frequently very defective in mathematical accuracy, and, like Caesar's wife, are not above suspicion.—I am, etc.,

Liverpool, Aug. 30th. JAMES BARR.

BELFAST ABATTOIR.

SIR,—In the BRITISH MEDICAL JOURNAL of August 21st the Market Committee of the Belfast Corporation is honoured by a notice of their report on "Some Modern Abattoirs and Abattoir Methods."

As one who had some responsibility in drawing up that report, I should like the favour of making a few remarks in reply to what I think an unfair criticism regarding the section dealing with different modes of slaughter.

Your correspondent says: "The precise signification of these two terms ('stunning' and 'shooting') is not quite clear," and then proceeds to "imagine" that what is really meant is "poleaxing" and "shooting." He is quite right that "shooting" means—shooting; indeed, I cannot understand how the precise meaning of *that* term should have given him any doubt. But he is quite wrong in his conjecture that "stunning" means "poleaxing"; if that had been meant, "poleaxing" is the word we should have used. Here also your correspondent need have had no doubt as to the meaning of the term, if he had read the explanation under the reproduction of the microscopic section (Fig. xi, Slide A) opposite p. 32, which runs, "Microscopic section of a piece of flesh of a bull killed by stunning *with the hammer*—ordinary method." However, he soon passes from "honest doubt" to open scepticism, as to the results obtained, in a series of original experiments to show that the flesh of a shot animal evidences putrefactive changes before that of one killed by stunning with the hammer. Will your correspondent let us know where he can obtain a record of any similar experiment which shows the contrary, in support of his assertion that "these results are not quite in accordance with those obtained by observers elsewhere"? It is hardly enough to assert that somebody has killed 30,000 animals annually by the "shooting" method, to prove that the experiments pursued in the Belfast abattoir do not bear out the conclusion noted by competent and trustworthy witnesses.—I am, etc.,

Belfast, Aug. 24th. ANDREW TRIMBLE, M.B., J.P.

*** The criticism was directed to the distinction which was made in the report between stunning and shooting. Whether a poleaxe, a hammer, or a shooting apparatus is used, the initial result is to stun.

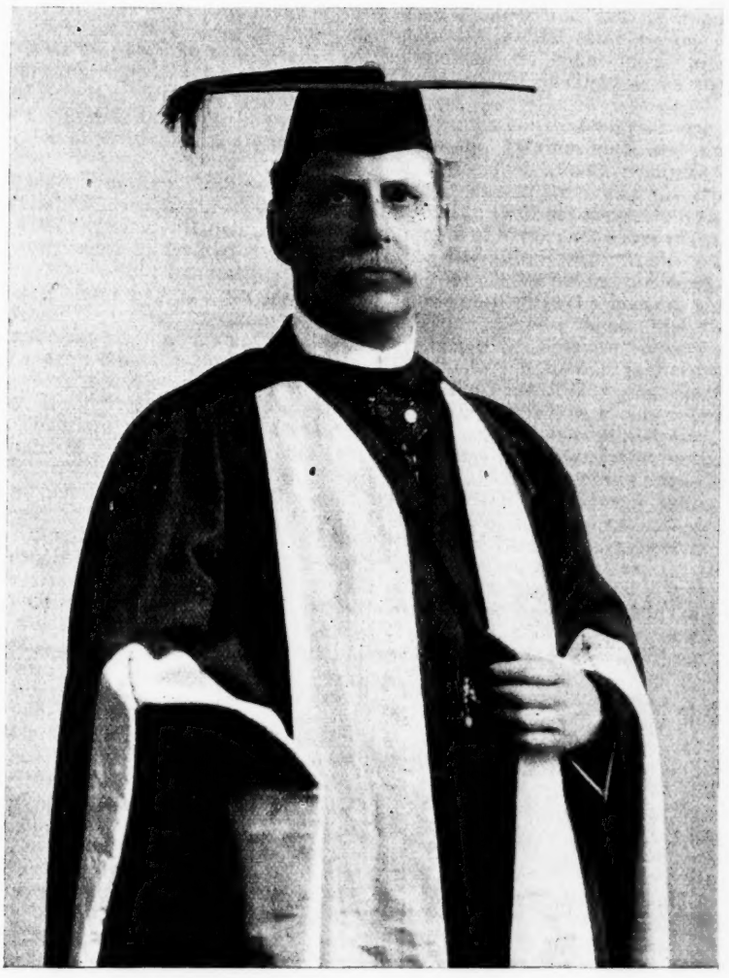
Obituary.

HENRY RADCLIFFE CROCKER, M.D., F.R.C.P.,

PHYSICIAN, SKIN DEPARTMENT, UNIVERSITY COLLEGE HOSPITAL.

WE had the grief to announce a fortnight ago the sudden death, on August 22nd, while on a holiday in Switzerland, of Dr. Radcliffe Crocker, well-known as a leader among English dermatologists, and to members of the British Medical Association also as an active member of its Council and Committees, and eventually as its Treasurer at a time when a momentous decision had to be taken.

Henry Radcliffe Crocker was born in Brighton in 1845, and received his early education in a small private school in that town. While still young he was apprenticed to a surgeon in one of the northern colliery districts, and while there made the acquaintance of one who had recently graduated in medicine in the University of London; he resolved himself to graduate in that university, and, while still continuing his apprenticeship, succeeded in preparing himself for the matriculation examination and subsequently for the preliminary scientific M.B. examination. He then entered as a student at University College Hospital, London, where he had a most brilliant career, winning the gold medal in materia medica at the first M.B. examination and the university scholarship and gold medal in forensic medicine at the final examination for the degree of M.B. in 1874. In that year he also took the degree of B.S., and in the following year graduated M.D. After holding the appointments of Clinical Assistant at the Hospital for Consumption and Diseases of the Chest, Brompton, and Resident Medical Officer at Charing Cross Hospital, he was appointed Resident Medical Officer at University College Hospital, and during the occupation of this office began to give special attention to the study of diseases of the skin, working with Dr. Tilbury Fox, whom he subsequently succeeded nearly thirty years ago as Physician to the Skin Department of University College Hospital. This appointment gave him ample opportunity for gaining experience in the speciality to which he had resolved to devote himself, but he also gave much time to histological investigations, and was enabled to make many important contributions to the science of dermatology. But though a specialist, he never allowed his outlook on disease to be narrowed; for him, as for all specialists of the highest class, the particular diseases of the special organ were always regarded from the point of view of general medicine.



Photograph by] HENRY RADCLIFFE CROCKER. *[Hermann Ernst*

He was never tired of insisting on the importance of treating the patient and his diathesis in order to obtain the best results from local treatment. In evidence of this we may mention incidentally the fact that he was for many years Physician to the East London Hospital for Children at Shadwell, and may refer also to the articles he contributed on special subjects to such standard works as Quain's *Dictionary of Medicine* and Allbutt's *System*. He kept himself well acquainted with the literature of dermatology, as is evidenced by his *Treatise on Diseases of the Skin*, a standard work which reached a third edition in 1903. In that year also he gave to the world many results of his ripe experience in the Lettsomian lectures on the "Conditions which modify the characters of inflammations of the skin and their influence on treatment," abstracts of which were published in our columns at the time. In these lectures, while discussing fully the nature of the local infective processes, he dwelt at length on the personal factor as illustrated by the influence of age and diathesis, and on the influence of the absorption of internal toxins, and of the nervous system, on the etiology and phenomena of diseases of the skin. These lectures were in the following year published in a small volume.

In his practice, Dr. Crocker was always among the first to test the value of new remedies and means of treatment, and his opinion upon their value was only formed after adequate experience and full consideration. He understood the value of obtaining graphic records of cases; his camera was always ready, and he had formed, in addition, a large collection of coloured drawings. He resolved to utilize some of this material for the production of an *Atlas of the Diseases of the Skin*, containing a series of illustrations from original drawings and descriptive letterpress; the first fasciculi of this work appeared in 1893, and the *Atlas* was completed in 1896. As was said in these columns at the time, the publication is of value not only to those practitioners who devote themselves more especially to dermatology, but to those also whose practice takes them into a wider field. Dr. Crocker contributed many papers to the medical journals, and was at one time an active participant in the debates and discussions of the medical societies.

He was an original member of the Dermatological Society, and was the first President of the Dermatological Section of the Royal Society of Medicine when that body was constituted by the amalgamation of numerous societies some two years ago. He was Vice-President of the Section of Dermatology at the annual meeting of the British Medical Association in Birmingham in 1890, and was President of

the same Section at the annual meeting in London in 1895. He was also an honorary member of many foreign societies, including the French, the Viennese, the Berlin, the Italian, and the American dermatological societies. Crocker, in fact, held a very high place in the esteem of dermatologists all over the world, who after learning to value his writings were, when they became acquainted with the man himself, charmed by his personality.

His character, indeed, was such as to endear him to all with whom he was brought into association—a true friend, always ready to give help in any difficulty. One upon whose judgement it was natural to rely with confidence, he was quite free from self-seeking and from that kind of intellectual pride which deters confidence; but all this the tributes printed below, from Mr. Butlin and other old friends, say better than we can.

Very early in his career Dr. Crocker began to take a deep interest in the British Medical Association; he became Honorary Secretary of the Metropolitan Counties Branch in 1889, and held that office for two years. In 1890 he was elected a Representative of the Branch on the Central Council, and remained a member until his election by the Association to be Treasurer at the annual meeting at Leicester in 1905. He retained the office for two years, resigning at the annual meeting at Exeter in 1907. Dr. Crocker had previously for some years been a member of the Journal and Finance Committee, and had rendered valuable services in that capacity. When he became Treasurer, the necessity of providing more office accommodation for the growing needs of the Association had become pressing, and when Dr. Crocker began the consideration of the subject, it soon became clear to him that there were three possible courses which the Association might take. The first was the enlargement and adaptation of the old building at 429, Strand; the second was to sell the premises and transfer the head quarters of the Association to another site; the third was to demolish the then existing building and erect new buildings on the site thus cleared. To the decision, which involved much anxious deliberation and many debates in committees and in the Council, Dr. Crocker brought to bear his marked business ability; he devoted much time and energy to a comparative study of the financial aspects of all three schemes; he personally visited many sites in various parts of London, and was ultimately convinced that the most prudent scheme and that most conducive to the best interests of the Association was to demolish the building in the Strand and erect in its place premises in accordance with modern requirements. This view commended itself to the Council and to the Association as a whole, and plans for the new premises were obtained. Had these been carried out as at first drawn the Library would only have been about half its present size, and there would have been no Council room. The Association owned other property close at hand, but, owing to the difficulty of securing an additional house so as to make the whole site contiguous, it seemed, at that time, that only the ground in the Strand and Agar Street could be used for the new premises. However, largely owing to Dr. Crocker's influence, properties were, after very delicate negotiations, exchanged, and a large contiguous site secured for the erection of the present premises.

It was during Dr. Crocker's period of office as Treasurer that the question of improving the form in which the BRITISH MEDICAL JOURNAL was published by lengthening the page so as to provide a longer column, permitting the use of larger print, came up for decision. Dr. Crocker went into the whole matter, which involved the consideration of many technical and financial questions, with characteristic thoroughness, and, having become convinced of the desirability of the change, used his influence to bring it about; we are able to say that he was much gratified by the result. This incident is only one instance of the care and time which Dr. Crocker was always prepared to devote to the service of his office as Treasurer. In every direction he gave minute attention to the task of increasing the revenues of the Association, and the very considerable success attained in the year 1906, when the revenue increased by nearly £2,000, was a source of much gratification to him. When speaking as Treasurer, either before the Council or at annual meetings, Dr. Crocker had a very clear and concise way of stating and explaining figures, and neglected no opportunity of giving the fullest information with regard to the finances of the Association.

When the Workmen's Compensation Act, which came into force on July 1st, 1907, was passed Dr. Crocker at once realized that it must involve considerable financial responsibility on medical men, and with his cordial co-operation a committee was formed to consider the matter. Eventually the Medical Insurance Committee, which is independent of the organization of the Association, but has offices at 429, Strand, was organized, and Dr. Crocker accepted the office of Chairman, which he continued to hold until his death. The agency established by this committee offers considerable concessions to medical men, and it was no small matter of congratulation to Dr. Crocker

that the profession so promptly realized the advantages of insuring through it.

Dr. Crocker never gave the impression of robust health, and on more than one occasion suffered from severe attacks of erysipelas. During the last, which occurred a few years ago, his condition was very critical, and after his recovery he had to consider the necessity of diminishing the amount of public work which he had been in the habit of doing in addition to conducting a large consulting practice. It was partly on this account, probably, that he gave up the office of Treasurer of the Association at the end of two years' service, and that this summer he tendered the resignation of his appointment at University College Hospital; his services were, however, so highly valued by his colleagues at that hospital that great pressure was put upon him to reconsider his decision. He had gone to Switzerland for rest, and to recruit his energies after a fatiguing spell of work, and it was while sitting in his hotel at Engelberg that he died, quite suddenly, of heart failure. Dr. Crocker married, in 1880, the daughter of the late Dr. Fussell. of Brighton. Much sympathy will be felt with Mrs. Radcliffe Crocker throughout the profession in the irreparable loss which she has so suddenly sustained.

Mr. H. T. BUTLIN, President of the Royal College of Surgeons of England, writes: Although I have known for a long time past that my old friend, Dr. Radcliffe Crocker, was unable to take active exercise as he had been accustomed to do, I attributed this to local trouble left by severe attacks of erysipelas, and I had not the least idea that his life was threatened. I was therefore equally surprised and shocked when the news of his sudden death reached me. For many years we have been associated in work and play; twenty years ago we used to play lawn-tennis regularly together through the winter, and thus became very intimate. The more I saw of him the more I came to esteem and admire him. I found in him an essentially good man, with a clean and wholesome mind, devoted to his profession, and pursuing it with the least possible thought of his own interests. Happily, our profession can boast of large numbers of men of the highest integrity, who pass through a life of practice with the consciousness that they have never placed their own interest higher than the interest of their patients. It is only natural that they should feel proud of having done so, seeing the many temptations to which medical men in every rank are subjected. But it seemed to me that Radcliffe Crocker had no pride in his conduct in this respect, since it would have been impossible for him to act otherwise than he did. Yet he must have been often subjected to sore temptation; for I believe that he had to fight his way through serious difficulties as a young man. This I have learned from other sources than himself. Not that he was reticent about his past or disinclined to talk of it, but that he did not deem it of sufficient interest to make it a subject of conversation.

As it was with the past, so was it with the present. I never knew him to speak boastfully or even with pride of the work he had done or was actually doing. If he spoke of it, it was with interest, as he might have spoken of the work of another man. Yet he had ample reason for pride, or even boastfulness, for his life has been very full of work of the highest kind; and if ever a man raised himself to the first place in his branch of medicine by industry and ability it was Dr. Radcliffe Crocker. Looking back on our conversations I am more and more impressed with this modest quality of his mind. Within the last two years he talked over with me the course he had better pursue under circumstances which might arise, and I then came to the conclusion that he was not really sensible of the position which he held as the foremost representative of scientific dermatology in this country, and of the value which other people set upon his services.

I do not think Dr. Radcliffe Crocker intended to practise more than five years longer. It sounds but a little while. But when I think of the many individuals who might have been the better for his care, of the many medical men who might have profited by his teaching, and of the new material he might have added to his speciality, it does seem a grievous pity that Death should have laid its hand upon him while his brain and mental energy were so keen and fit for work.

I shall miss him sadly.

AN OLD FRIEND writes: It is forty years ago since Radcliffe Crocker and I first met at University College, and a friendship then formed has only deepened with years, and now forms one of my happiest professional recollections. Radcliffe Crocker was a little older and somewhat more experienced than most of his immediate contemporaries, and this fact, coupled with a certain grave determination about his work, singled him out from amongst us. I think we all knew that the study of medicine had come as a "second thought" to him, and his intimates knew that it was a "grand passion" for which he was making considerable sacrifice. He was not only a hard worker, but a very methodical and thorough worker, and he at once took a place among the very best men in the school. His influence in the school was distinctly a steadying one, and it was greatly helped by his good humour and ease of approach; there was no aloofness about him, and no one could enjoy a joke better than he or take more pleasure in sharing such intellectual scintillations as pass muster among students as wit.

I remember that we took our M.B. degrees at the same time—he gaining high and deserved honours—and we held resident appointments in the hospital at the same time. It was then that his clinical acumen had the first opportunity of showing itself, and, allied as it was to great powers of work and a love of completeness, it was evident that Radcliffe Crocker would go far, and amply and honourably justify his second choice of a profession. But I think it was only when he became the Resident Medical Officer in the hospital that his full powers were rightly appreciated. This was a very difficult post to fill well, and just when he held it there were conditions that called more than usually for great discretion. Radcliffe Crocker's tenure of office was a complete success; he showed himself a most able administrator, in discipline fearless and wise, and in professional responsibilities singularly alert and reliable. One of his duties was to teach anaesthetics, and in this he showed that power of interesting his students in his subject and skill in imparting knowledge that have been so conspicuous in his work in the skin department of his hospital for the last thirty years. His gifts as a teacher were quickly recognized, and for some years he was much sought after as a private coach, and was able by this means to support himself while laying the foundation of his successful practice as a physician.

Of his work and success as a dermatologist it is not for me to speak, but I should like to refer to one or two marked traits in Radcliffe Crocker's character. The one which underlay his conspicuous success was his thoroughness. I have never known a man to whom the term "slovenly" could be less aptly applied. He was such a good dermatologist largely because he had such a thorough knowledge of all branches of his profession. He was the very antithesis of the "narrow" specialist; and then, in his own chosen subject, it was difficult to say whether his knowledge of the work of others was more complete than his own clinical and pathological investigations, or whether either of these was equalled by his diagnostic and therapeutical skill. A second great characteristic, as I knew him, was his confident hopefulness; he had great difficulties to overcome; thrown upon his own resources from his earliest student days, with an ample share of professional rivalry and competition, and a stranger to the experience of sound health for more than thirty years, he yet never lost heart or hope, but bent his back to his oar, pulled his hardest in confident assurance of the result. Nor was he disappointed. Success crowned his efforts to an extent that is charming to contemplate. His merits obtained the fullest recognition from his friends, his colleagues, his professional brethren, and the public Nor would I forbear to mention as another prominent characteristic of Radcliffe Crocker—his goodness. He knew that there is a clear dividing line between good and evil, and he loved and lived in the good. With a very keen appreciation of the things that pertain to the brighter side of human existence, he could only enjoy them if unsullied by the stain of selfishness and sin. His success came by his own effort and merit, not by over-reaching a rival. And so he ever lived among us as a man of "good report," an example of unflagging industry, of dauntless courage, of bright hope-

fulness, and of patient well-doing. It was good to have known him, and to have been his intimate friend for nearly forty years has been one of my happiest experiences.

Dr. PERNET writes: I am desirous of adding a few words as a tribute to the memory of my friend and teacher, Dr. Radcliffe Crocker. We had worked together for the last seventeen years, and always harmoniously. I have therefore had a better opportunity than any one else of being impressed by his greatness as a dermatologist, as a physician. He was no narrow specialist, but took in all the points of a case, and I consider it a privilege to have been associated with so broad-minded and far-seeing a clinician. His all-round knowledge of cutaneous diseases in their varied aspects and multiform phases was enormous. But I consider he was specially pre-eminent in diagnosis, prognosis, and treatment; his clinical acumen and his skill in adapting remedies to the protean manifestations of morbid conditions of the skin were of the very highest order, and in my experience unsurpassed by any one practising this great branch of medicine. At the meetings of societies and at international congresses the opinion of Radcliffe Crocker in difficult and unusual cases was eagerly invited, for it was felt that if any light could be thrown on the matter, he was the one man able to shed it. As a teacher he took great pains to make a very difficult subject as clear as possible by making students work out cases for themselves, in order to train their powers of observation and reasoning, but his searching and at times acutely stinging cross-examination was not always appreciated by the youthful victims of this Socratic method, although it drove home a point that would probably never be forgotten. *Experto crede Roberto.* I had the pleasure of helping Dr. Radcliffe Crocker in various ways with the second and third editions of his splendid *Diseases of the Skin.* This gave me an opportunity of seeing another side of his professional activity. His powers of synthetizing and focussing his vast experience, together with his indefatigable industry in reading and classifying the almost endless contributions of dermatological writers all over the world, impressed me greatly. This was specially noticeable in the preparation of the third edition, a herculean task this wrestling with a heterogeneous mass of material, which had to be assimilated and boiled down mentally in the midst of a large and busy practice and multifarious engagements. His *Diseases of the Skin* will go down to future generations in the world of dermatology as a monument of sound knowledge, industry, and honesty of purpose and execution. I should like to take this opportunity, too, of saying that his wife's untiring assistance in many ways—as in the preparation of his book, for instance—was invaluable to him in coping with the large amount of work he had to deal with in various directions. With regard to treatment, he always took the keenest interest in new methods, and kept himself abreast of the times with unflagging energy. In the records of dermatology his name will go down to posterity as a master. Dr. Radcliffe Crocker was undoubtedly the foremost dermatologist of Britain and her great Empire, and his position second to none among the dermatologists of other nations. I was looking forward to his return from Switzerland recuperated by the rest and the mountain air. It was not to be. I shall never see my friend and teacher again, but the memory of his courage as a worker and his many qualities will remain with me. *Æternum vale!*

DR. MAX RUNGE, Professor of Obstetrics and Gynaecology in the University of Göttingen, died on July 27th, in his 60th year. In 1883 he was appointed Professor in the University of Dorpat; five years later he was called to Göttingen, in the following year was appointed Director of the Clinic for Women. Professor Runge was a voluminous writer, having been the author of handbooks of obstetrics and gynaecology, and of a work on the diseases of the first years of life. He took a great interest in the improvement of the education of midwives, and was entrusted with the duty of revising the official Prussian handbook for midwives. In July, 1908, he was chosen Dean of the Medical Faculty, but early in the summer session began to suffer from symptoms of stone in the kidney, to the consequences of which his untimely death is to be attributed.

SIR STEPHEN MACKENZIE, M.D., F.R.C.P.,

CONSULTING PHYSICIAN TO THE LONDON AND TO THE ROYAL LONDON OPHTHALMIC HOSPITALS.

SIR STEPHEN MACKENZIE died at the residence of his son at Dorking, Surrey, on September 3rd. We are indebted to his colleague, Dr. F. J. Smith, for the following biographical note:

Sir Stephen Mackenzie was born in 1844 at Leytonstone, and received his education at Christ's Hospital, which he left in 1859. Entering at the London Hospital in the early Sixties, we find him taking scholarships at that school for anatomy and osteology, and in 1869 for surgery; in that year he took his M.R.C.S. He proceeded to Aberdeen University, where he graduated in 1875 with the highest honours, and he completed what may be called his educational career by study at the University of Berlin. He thus early gave strong proof of that keen energy which always characterized his work, for he took his M.B. at Aberdeen with highest honours while acting as Medical Registrar at the London Hospital.

Judging by records, he was still Medical Registrar when elected Assistant Physician, for he held the former post during the whole of the years 1874 and 1875, and he was elected Assistant Physician in March, 1874.

He very soon showed the immense power of work that was in him, for he rapidly became the most popular teacher in the hospital, not only in general medicine, but in the skin department also, notwithstanding the heavy claims of a rapidly increasing practice, and those, too, of publishers who were anxious to get material from his pen.

Within a few years he was elected Lecturer on Medicine, and I can well remember the enormous amount of care and trouble he expended on his lectures, a copy of the headings of each lecture being distributed to every man present. The crowded state of the theatre was an eloquent tribute to his popularity as a lecturer, while his fame as a clinical teacher at the bedside made his visits to the ward something of a triumphal procession, much to the disgust of us, his clinical clerks.

During the years, say, from 1875 to 1890, Mackenzie built up a reputation for hard work, skill, and clinical powers of observation which no lapse of time will ever dim in the minds of those who were privileged to sit at his feet, and it is no easy task to pick out the particular points which were the chief stones in the building. His work with the ophthalmoscope—then almost a new instrument of clinical investigation—was perhaps what impressed us students most. He was, by the way, Physician to Moorfields Eye Hospital at the time, and his experience at that hospital left its mark on many diseases—albuminuric retinitis may be mentioned as an example; upon this condition he was then a well-known authority, and Dr. Hughlings Jackson gladly acknowledged the aid he got from Mackenzie in the days when he was working on cerebral tumours.

Anaemia was another subject which Mackenzie at that time made specially his own, particularly the severer forms of it, but space will not permit me to enumerate all the subjects he took up. Suffice it to say that he never touched one that he did not leave enriched by all that patient research and clinical investigation could give to it. Filariasis and sleeping sickness might be instanced as two diseases which he took up and studied so far as the limited material at his disposal permitted him; the parasitic causation of the latter had not then even been suggested.

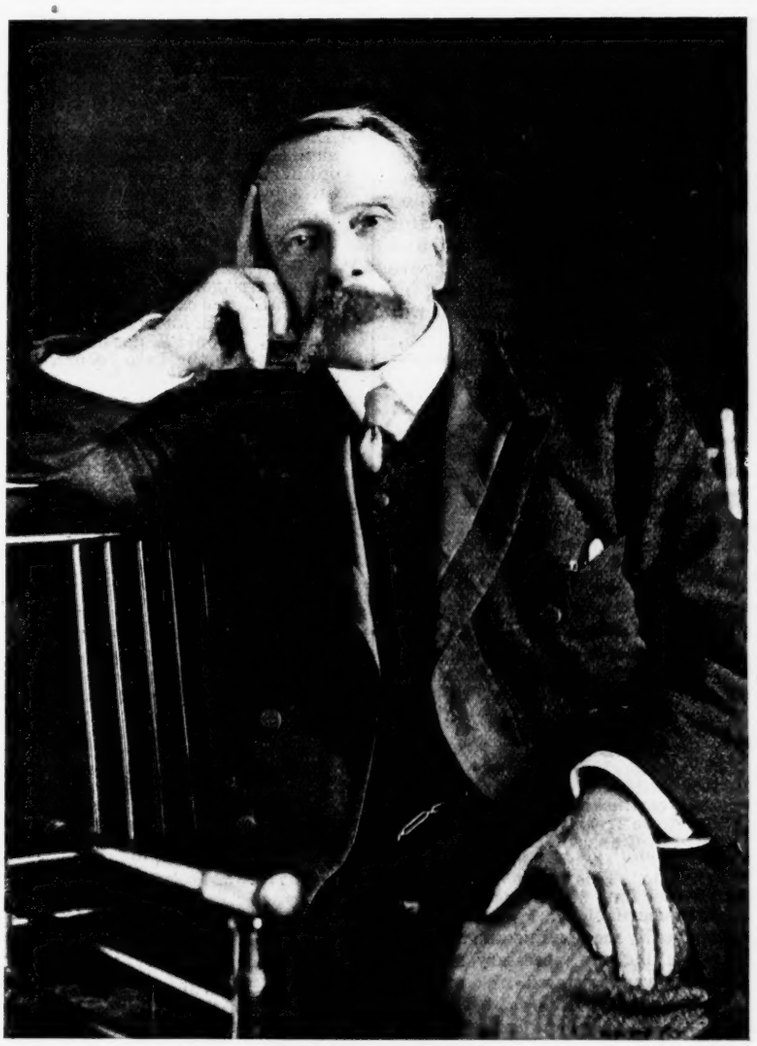
During the last ten years of the last century Mackenzie was at the very zenith of his fame and enjoyed the respect and something more of a very wide circle, while his advice was highly valued as that of a man who knew very thoroughly what he was talking about. With the advent of the present century, asthma, the disease to which he eventually succumbed, began to make serious inroads on his health, and he was soon obliged to seek relief by spending the winter in Egypt. At first his health seemed to be quite restored, but latterly the trouble made such rapid progress that he was obliged to relinquish practice altogether; and probably this very unseasonable summer has had a good deal to do with his death, which took place on September 3rd, after most painful sufferings, borne with heroic fortitude. My last interview with him was on August 28th, when I was requested by my namesake and colleague to see him in consultation, when I was rather struck by his wish not to be

told anything of what I thought of his disease, though, curiously enough, his vessels were those of a young man of 40, notwithstanding the strain they must have suffered.

He always took the very keenest interest in the welfare of the students at the London Hospital, and though I never knew that he took any personal part in sports and games, he was ever ready to support our Clubs Union with voice and pocket, and was one of the most popular of its presidents.

As a colleague it is impossible to speak too highly of his courtesy and consideration for all his juniors, and whenever he thought he might possibly have betrayed any undue irritation at opposition he was always the first to make overtures towards smoothing over the rift within the lute, and I can honestly say that I never heard him support an unrighteous cause; on the contrary, he fearlessly stood up for everything that was right, no matter how specious the arguments used to make wrong seem right; he was a man to appeal to in a difficulty, though his advice was sometimes unpalatable.

His memory will ever remain green at the London while any one remains there who knew him, for it was to him on the medical side and Treves on the surgical that the London Hospital owes the rescue from unpopularity which took place about 1879, and I am pleased to think has remained to the present day.



Photograph by] SIR STEPHEN MACKENZIE. *[Olive and Katharine Edis.*

We may add that Sir Stephen Mackenzie took an active interest in the British Medical Association. He was Vice-President of the Section of Dermatology at the annual meeting at Bristol in 1894, and of Medicine at that held in London in 1895. In 1897, at the annual meeting in Montreal, he was President of the Section of Medicine, where he delivered a scholarly address on the influences that had determined the progress of medicine during the preceding two and a half centuries. He was President of the Metropolitan Counties Branch in 1901 and 1902. In 1903 he received the honour of knighthood. He was at one time President of the Hunterian Society of London, and was a corresponding member of the French society of dermatology. He was a voluminous writer, many of his lectures and papers being published in these columns; among these were the Lettsomian lectures on the pathology, symptoms, and treatment of anaemia, delivered before the Medical Society of London in 1891. He also gave the annual oration before the same Society, on the powers of natural resistance or the personal factor in diseases of microbic origin, in 1902.

We are indebted to Dr. Osler, Regius Professor of Medicine in the University of Oxford, for the following tribute: May I add a few words of appreciation of the lifework of Sir Stephen Mackenzie? Since 1873, when we studied together at the Charité Hospital, Berlin, we have been fast friends, and one of the great pleasures of my visits to London was to renew our friendship. Few men of his generation were more devoted to clinical study. He loved the hospital and his teaching, and generations of old London students look back with pleasure to the accurate clinical lessons they received from him. He became a great favourite with our Canadian students, and the McGill men were usually consigned to him by Dr. Shepperd (also a very old friend) or myself. His writings not only bore the stamp of sincerity, but there was that special touch which is only to be acquired in a wide and studious experience. He met with the distinguished success that his merits deserved, and when he became the valued consultant of an ever-increasing circle in the profession success did not spoil him. But the true gold of the man was shown in the heroism with which for years he fought an ever strengthening foe—always cheerful, always facing his fate with the unbowed head, never despairing, even when the outlook was the darkest. And of all features in his life, this to his friends will remain an enduring memory.

JOHN MILNE DALRYMPLE,

M.B. CH.B.EDIN.

ON August 26th, Dr. John Milne Dalrymple was cycling to see a case along the Stratford Road, Birmingham, riding behind a tram-car, at about five yards distance. He had occasion to go down a street running to the right, at right angles to Stratford Road. Whilst going at the same rate as the tram he suddenly turned to the right to cross into the street, and immediately collided with a car coming in the opposite direction. He was thrown off by the mudguard, unconscious, and was carried into a shop near by, where he expired in about three minutes. He sustained a bad laceration of the upper lip, with crushing of the right upper jaw, but death was due to laceration of the brain beneath a skull very badly fractured below the occiput.

Dr. Dalrymple was born in Birmingham on March 21st, 1884, and the following year was taken to New Zealand by his parents, his father going to that country to take charge of a Presbyterian church. He was educated at the Dunedin High School, going from there to the Otago University at Dunedin to commence his medical studies; thence he proceeded to Edinburgh University, where he studied, and graduated M.B., Ch.B. in 1908. He left Edinburgh to spend a year as Resident Medical Officer at the Birmingham Infirmary, and completed this at the end of July. For the first fortnight in August he went to camp with the Bristol Royal Engineers at Tewkesbury in the

capacity of medical officer. He was a keen volunteer of some years' standing, commencing this career in the Dunedin High School Cadets; he transferred from these to the "Kilties"—the Royal Scottish (9th Battalion, H Company) at Edinburgh. At the formation of the Territorial Force he transferred to the 2nd South Midland Mounted Field Ambulance, Birmingham, in which he held a commission as second lieutenant at the time of his death. He was looking forward to a visit to his parents very soon, having only last month been appointed surgeon to the Tyser liner *Mimiro*, which sailed for New Zealand on September 4th.

A memorial service was held at the Infirmary Chapel, Birmingham, synchronously with his burial at Edinburgh, on Monday, August 30th, and the chaplain paid an eloquent tribute to his character and attainments. He was a man of most excellent moral character, had a quiet, earnest presence, and his thoroughness and gentleness endeared him alike to his patients and colleagues.

Dr. Elias Haffter, who for some twenty years from 1887 was Editor of the *Correspondenz-Blatt für Schweizer Aerzte*, the chief medical journal of German-speaking Switzerland, died on August 4th, after a long illness originating in a septic infection contracted while operating several years previous on a case of uterine cancer. Haffter was a high-minded man, who earned the esteem and respect of the profession in his native country. He gave a great deal of time to his duties as editor, and during his term of office its circulation both at home and abroad was largely increased.

Medico-Legal.

VACCINATION AND THE REGISTER.

F.G.P. writes: An illegitimate child has its birth registered in the father's name, Smith. It is afterwards christened in a Catholic church in the mother's name, Jones. The child is brought for vaccination, the form bearing the name Smith. The doctor is told the circumstances. Which name should be employed in filling up the form? These names are fictitious.

*** The entry in the register is incorrect, and the parent making it is liable to a penalty, if detected, but the doctor who vaccinates it is bound to follow the register. He has no responsibilty for errors in the entry on the register and has nothing to do with the baptismal register.

MEDICAL REGISTRATION AND LUNACY FEES.

A. M. writes: I registered in January, 1909, at Edinburgh, and have in my possession my certificate of registration. In August last I signed a lunacy certificate; the parish council have since informed me that I shall receive no fee for this, as my certificate was not accepted by the sheriff clerk, who stated that I was "not registered." The parish council obtained another medical man's certificate. This seems very unjust, and I shall be glad to hear whether I am not entitled to recover the amount of my fee from the sheriff clerk.

*** The sheriff clerk undoubtedly made a mistake in rejecting the certificate without taking the necessary steps to ascertain whether the signatory was registered. We presume that he was guided by the copy of the *Medical Register* for 1909, which could not contain the name of our correspondent, but whether it would be possible to recover the fee is very doubtful.

REGISTERED MEDICAL PRACTITIONERS AND PHARMACY.

R. W.—The Fellows, Members and Licentiates of the Royal College of Physicians of London, and the Fellows of the Royal Colleges of Physicians and Surgeons of Edinburgh and of Ireland, and of the Faculty of Physicians and Surgeons of Glasgow are prohibited from keeping open shops for the sale of drugs, and it is to be desired that every member of the medical profession should act in accordance with this rule, for to engage in the trade of pharmacy is inconsistent for the members of a liberal profession. But the Act to amend the Pharmacy Act, 1868 (32-33 Vict., cap. 117), expressly exempts legally qualified medical practitioners from any legal restrictions, Section I reading: "Nothing contained in the first fifteen sections of the recited Act shall affect any person who has been registered as a legally qualified medical practitioner before the passing of this Act; and the said clauses shall not apply to any person who may hereafter be registered as a legally qualified practitioner, and who, in order to obtain his diploma for such registration, shall have passed an examination in pharmacy."

Medico-Ethical.

The advice given in this column for the assistance of members is based on medico-ethical principles generally recognized by the profession, but must not be taken as representing direct findings of the Central Ethical Committee.

ATTENDANCE ON THE FAMILIES OF MEDICAL MEN.

Dr. Philip G. Borrowman (Troon, N.B.) writes: I cannot think that the advice given to "B." under the above heading in the Journal of August 28th, p. 578, is in the best interest of the profession. It is, of course, true, as you say, that "there is no obligation to attend the families of medical practitioners without payment," but it is customary among better-class men to do so; and surely no member of our profession who is not a sordid money-grabber would hesitate to give his services gratuitously to the family of a professional brother whom blindness prevents from practising, even though his wife may have enough to live on. "B." says he is a young practitioner. If he will take the advice of an older man, and "do as he would be done by," his life will not be less happy.

M.D. writes: In dealing with well-to-do relatives of medical men I find it best to appeal to the *amour propre*. I send an ordinary account, but write at the top, "payment optional." A cheque usually follows by return of post.

SUPERSESSION.

P. L. B. writes: B., the usual attendant, was sent for to a case of miscarriage, but was not at home, and a neighbouring doctor, L., was called in and still keeps on with the case. L. has never let B. know in any way about it, or offered to resign the case. Should L. not have done so? There is no resident doctor where the case occurred; B. lives three miles away and L. seven miles.

*** Upon the facts as stated if L. knew that B. was the usual medical attendant on the family he should have regarded his attendance as merely due to an emergency and have communicated with B. so that he might take charge of the case.

Universities and Colleges.

UNIVERSITY OF LONDON.

Appointments Board.

The Principal of the University of London gives notice that an Appointments Board has been constituted "to assist graduates and students of the university in obtaining appointments, and to co-ordinate and supplement the work done by the schools and institutions of the university with this object." The aim of the Board is to encourage the selection of university men for all posts in the work of which the possession of a university training on scientific methods is an advantage. The Principal asks those who may know of any vacant appointments suitable for university men to communicate with the Secretary of the Board at the University, South Kensington, S.W., so that he may put forward selected candidates.

UNIVERSITY OF BIRMINGHAM.

Honorary Degrees.

The council has decided, on the recommendation of the Senate, to confer for the first time a certain number of honorary degrees on distinguished persons in connexion with the recent Royal visit. Since it was not practicable to hold the ceremony on the actual occasion of that visit, it has been decided to hold it in the hall which the King opened, on Wednesday, October 20th. The following is a list in alphabetical order of those who have accepted the offered degree of Doctor of Laws: William Nicholas Atkinson, the Right Hon. A. J. Balfour, F.R.S., the Bishop of Birmingham, Bernard Bosanquet, Henry T. Butlin, F.R.C.S., Andrew Carnegie, Sir William Crookes, F.R.S., Maurice Fitzmaurice, C.M.G., Sir Archibald Geikie, P.R.S., the Right Hon. R. B. Haldane, F.R.S., John Scott Haldane, F.R.S., J. Rendel Harris, Sir Charles Holcroft, Bart., G. J. Johnson, Sir Alexander B. W. Kennedy, F.R.S., Sir Joseph Larmor, F.R.S., the Righ Hon. Walter Long, Gilbert Murray, Sir Richard Douglas Powell, P.R.C.P., Sir William Ramsay, F.R.S., Lord Rayleigh, F.R.S., Ernest Rutherford, F.R.S., Arthur Shadwell, Mrs. Henry Sidgwick, Lord Strathcona and Mount Royal, Professor Silvanus P. Thompson, F.R.S., William Augustus Tilden, F.R.S., Sir J. J. Thompson, F.R.S., Charles S. Tomes, F.R.S., T. Herbert Warren, Dr. Windle, F.R.S., Viscount Wolverhampton. In addition to these names, the Chancellor, the Right Hon. Joseph Chamberlain, has been invited to associate himself as a graduate with his co-workers, and to receive the honorary degree of this university, and he has consented to receive it *in absentia*.

Public Health.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Birmingham.—Dr. Robertson is of opinion that the population of Birmingham, estimated by the Registrar-General as 558,357 in the middle of 1908, is 25,000 or 30,000 in excess of the actual population. The birth-rate during the year was 28.4 per 1,000, and the death-rate 15.9. The death-rate was the lowest that has ever been recorded in Birmingham. There were, however, certain districts in which a high death-rate prevailed, notably in St. Mary's Ward, where, in a population of 12,000 persons, the rate was 26 per 1,000, and in St. Stephen's Ward, where it was 23 per 1,000 in a population of 22,000. In the whole city the infantile mortality-rate was 145 per 1,000 births, though in five wards it exceeded 200. The appointment of a lady medical assistant, whose whole time will be devoted to these wards, cannot fail to have an effect in the reduction of this high rate of infantile mortality. As Dr. Robertson very properly points out, the conditions of poverty, want of cleanliness, ignorance, carelessness, or drunkenness under which many people live constitutes the greatest hindrance to progress, and it is very largely from betterment in these directions that further progress in healthiness must be expected. The Salterley Grange Sanatorium, near Cheltenham, was opened for Birmingham patients in January, 1909. It is intended to admit into this institution, which is supported entirely out of the Birmingham rates, only those persons who are in the early stages of consumption. There is accommodation for 40 patients, each of whom has a separate room, with the object of making him familiar with the best way of arranging his own room when he returns home.

Rhondda.—In his eighth annual report on the health of the Rhondda, the medical officer of health, Dr. J. D. Jenkins, deals exhaustively with the sanitary condition of the large area under his control. Estimated in the usual manner, the population mid-year 1908 was 133,137, but if estimated on the basis of the number of houses occupied in the district the figure becomes 140,819. According to the official returns of the Registrar-General, Rhondda maintains its position as the twenty-fourth largest as regards population of the seventy-six great towns in England and Wales. During the year 5,454 births were registered, being equivalent to a birth-rate of 41.4 on an estimated population of 133,137. This total exceeds the average for the previous ten years by no fewer than 834. The "natural increase," that is, excess of births over deaths, was 2,938, exceeding that for 1907 by 240; total deaths of 2,446, equivalent to a death-rate of 18.9 per 1,000 per annum. This rate is higher by 2.5 than in the previous year, although it is a fraction under the average for the ten previous years. The diseases which contributed most largely to the death-roll of the district were diarrhoea, lobular pneumonia, bronchitis, heart disease, consumption, and measles. With regard to the increased infantile mortality in 1908 over the two previous years as compared with the rest of the country, the Rhondda rate is decidedly high; the average for the seventy-six great towns for 1908 is only 129 per 1,000 registered births, and the position of the Rhondda is seventy-fifth on the list, being 184 per 1,000 births. The zymotic death-rate of 4.02 per 1,000 persons living is the most unsatisfactory feature in the vital statistics of the Rhondda for the year 1908, and it exceeds the average for the ten previous years by 0.62, that being the highest death-rate from this cause of the seventy-six great towns, and is due principally to the excessive mortality from diarrhoea. No case of small-pox was notified during the year. Towards the end of 1907 measles appeared in epidemic form, and during 1908 was responsible for 102 deaths, being equivalent to a death-rate of 0.77 per 1,000. There was an increase of 162 in the cases of scarlet fever. Of the 185 cases of diphtheria notified, 32 proved fatal, the disease being most fatal during July. The 96 cases of typhoid fever notified was the smallest in any year since the adoption in 1894 of the Infectious Diseases Notification Act of 1889. There was a slight increase in the total number of deaths from consumption in 1908, and although there was considerable prevalence of influenza, the fatal cases resulting therefrom were fewer than in 1907. Colliery fatalities numbered 48, equivalent to a death-rate of 0.36 per 1,000, no colliery disaster of great magnitude having occurred. The Council's water supply is dependent in the main upon the surface and spring waters feeding the Selsig, Ffernol, and the upper portions of the Rhondda Fawr stream, and water drawn from these sources suffices under normal conditions to fill, and to keep full, the Tynewydd reservoir with a capacity of 7,000,000 gallons. Notwithstanding the small available storage now possessed by the Council, a constant supply was provided throughout the whole of the Council's area during the year.

POSITION OF NON-RESIDENT DISTRICT MEDICAL OFFICERS.

G. W. unfortunately does not hold the same safe position as he would if he were a resident in the district for which he officiates, as without any Local Government Board inquiry the guardians may, if they think fit, cease to reappoint him to the office he now holds when his present year of office expires.

REMOVAL OF ALLEGED LUNATICS TO WORKHOUSES BY RELIEVING OFFICERS.

PERPLEXED (a district medical officer) writes that he certified as follows in reference to a patient of his own residing in a district adjoining his own: "This is to certify that A. B., residing at ——— is, in my opinion, of unsound mind." That when he called the next day he found that the patient had been removed to the workhouse by the relieving officer without consulting him in any way. One correspondent asks whether the relieving officer had a legal right to remove the patient as he did, considering that he himself was prepared to certify.

*** When from information received a relieving officer considers it incumbent upon him to take up any case of alleged lunacy he is bound to comply with all the provisions of the Lunacy Act, 1890, and it does not seem that the law was infringed by the removal of the patient in question to the workhouse as described.

The Services.

THE ROYAL NAVY.

EYESIGHT AND HEARING TESTS.

THE Admiralty, having had its attention drawn to the desirability of periodically testing the eyesight and hearing of men in the Royal Navy, with a view to obtaining information which will assist the commanding officers of ships in stationing the crews for action, has decided that in future the medical examination of men for draft shall include tests for eyesight and hearing. It is to be distinctly understood that this examination is not intended for the purpose of invaliding men, but simply to ascertain whether defects in vision or hearing exist, a notation of the defects discovered being made on the medical history sheets.

THE ROYAL NAVY MEDICAL SERVICE.

M. O. writes: In the JOURNAL of August 28th, p. 577, a correspondent compares the Indian Medical Service unfavourably with the Army Medical Service. What, then, can be said of the Naval Medical Service? There the conditions are so uninviting that for years there has been practically no competition for vacancies, and so far we have waited in vain for the improvement which there was some hope might result from the deliberations of the Commission. The unpopularity of the naval service will be understood if the following points are considered:

1. *Allowances.*—What with field, hospital, and lodging allowances, the R.A.M.C. leaves the navy far behind. The most important of these, because the most constant, is lodging allowance. With rare exceptions, it is obtainable by army medical officers, and, of course, it implies, too, that messing expenses are saved. In the navy, by the nature of the case, such a thing as lodging allowance is quite rare. Bachelors will treat this matter lightly; not so married men or such as contemplate marriage.

2. *Travelling Expenses.*—Officers of the army are now allowed travelling expenses for their families on changing station. Not so in the navy. There the only concession is in the rare event of an officer proceeding to a foreign shore establishment of three years' duration, in which case half the expenses of his family is met by the Admiralty.

3. *Half Pay.*—Let no unwary graduate suppose that this is a dead letter in the navy. It is true that an officer of surgeon's rank is exempt (practically), but on attainment of staff rank, by which time he may have his own home to maintain, he will one day suddenly find himself on half pay, with no limit fixed to its duration. He is thereby hit not only at the time in his pocket, but afterwards, when the lost time has to be made up for pension. With equal suddenness, he will at last see his new appointment in the newspapers, and then he will have the privilege of paying his own fare to his ship. Needless to say, such an unfair system does not exist in the splendidly organized R.A.M.C.

4. *Leave.*—As regards leave, there is no need for details. Enough to say that for the months granted in the army one is lucky to get weeks in the navy.

5. *Gratuities.*—A most unpleasant impression was created by the case of the late Surgeon Glyn. No unofficial assurances can assuage the uneasiness or undo the precedent thereby established, that a dying man cannot depend on receiving the gratuity which, by his term of service, he has earned. Another point worth notice is that a gratuity is regarded by the Revenue authorities as income, and is accordingly subjected to income tax.

INDIAN MEDICAL SERVICE.

THE INDIAN MILITARY SERVICE FAMILY PENSION.

THE Government of India has decided that officers of the Indian Medical Service who subscribe to the Indian Military Service Family Pension shall in future do so under the same conditions as officers of the Indian Army, that is, their classification should be regulated according to length of service, instead of according to rank, as follows: Surgeon-Generals should be allowed to subscribe in Class 1 as hitherto; Class 2, officers of twenty years' service; Class 3, officers of twelve years' service; Class 4, officers of six years' service; Class 5, officers of less than six years' service. No existing subscriber should be reduced to a lower class than that in which he now subscribes. These orders are to take effect from May 16th.

Letters, Notes, and Answers.

BRITISH MEDICAL ASSOCIATION AND BRITISH MEDICAL JOURNAL.

THE offices of the British Medical Association and of the BRITISH MEDICAL JOURNAL are at 429, Strand, London.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

I. F. asks for references to literature on the subject of treatment of phthisis by intravenous injections of iodoform.

R. asks for information and references to literature on the results of the various operations for the cure of congenital dislocation of the hip.

T. desires to hear of a settee or couch (upholstered) suitable for a consulting-room, and which can, when desired, be raised to a height suitable for an operating table and have the arms and back put down.

DR. J. HILL GIBSON (Parkstone, Dorset) asks to be referred to the most complete account of Elliott and Pope's operation of preliminary capsulotomy, in cataract extraction, as practised in Madras.

THE DANGER OF FLIES.

DR. H. RAINSFORD (Woodley, Reading) writes: "Medicus" (BRITISH MEDICAL JOURNAL, August 21st, p. 500) recommends spraying with Sanitas as a remedy for flies. I tried it, since reading his letter, without any effect. I should be glad indeed, to hear of anything which would mitigate this nuisance, as, where I live—in a new house, with no putrefying heaps near—there is a veritable plague of flies; so much so, that I fear the walls, which have just been papered, will require to be covered again in a few months.

A QUESTION OF SALARY.

F.G.P. writes: What would be fair remuneration to ask for acting as medical officer to a home for little children? The home contains about fifty children, aged 11 months to 8 years, and it is required to examine each child thoroughly at least once a year; to visit the home at least once a week; to treat all minor ailments and give general advice *re* care and management of children individually and collectively: to treat eye diseases which may occur amongst the children. The writer has had special experience with this branch. The honorary medical officer, who lives nearer the home, is called upon for accidents and urgent or acute cases.

*** We cannot answer this question with any authority, but it may be suggested that the salary for the duties specified ought not to be less than £50 per annum.

MENTAL DEFICIENTS.

A. P. desires to hear of a home or reformatory for a girl, aged 18, ill developed both mentally and physically, with a bad temper, and unmanageable at home; the parents are not well off.

*** Our correspondent might apply to the Rev. H. N. Burden, a member of the late Royal Commission on the Feeble-minded, who has established the Stoke Park Colony, Stapleton, near Bristol.

M. B. asks where a tutor could be obtained for a mentally deficient lad of 15 years, whose parents, though not well off, desire that he should remain at home.

*** Male tutors, properly trained, are hardly to be had for such cases. Trained women teachers used to boys of 15 might be heard of on application to the Principal, St. Christopher's School, West Ealing, London, W.

EXAMINATION FOR THE F.R.C.S.I.

STAFF SURGEON, R.N., asks what books are recommended to be read for the final part of the F.R.C.S.I.

*** The following may be mentioned as suitable, but there are, of course, many other standary works:—Surgery: Rose and Carless's *Manual of Surgery for Students and Practitioners*, 7th edition (London: Baillière, Tindall, and Cox, 1908, 21s.). Operative Surgery: Waring's *Manual of Operative Surgery*, 3rd edition (London: H. Frowde, and Hodder and Stoughton, 1909, 12s. 6d.); or Bickham's *Textbook of Operative Surgery*, 3rd edition (Philadelphia and London: W. B. Saunders Co., 1908, 28s.). Surgical Pathology: Bowlby's *Surgical Pathology and Morbid Anatomy*, 5th edition (London: J. and A. Churchill, 1907, 10s. 6d.).

ANSWERS.

A. G. A.—The full reference to the paper mentioned by Dr. Theodore Williams in the lecture published in the JOURNAL of August 21st is as follows: "Sur l'origine intestinale de l'anthracose pulmonaire par Vansteenberge et Grysez" (*Annales de l'Institut Pasteur*, 1905, xix, 787).

S. W.—The work on *Teleology and Pathology*, by E. Albrecht, mentioned on p. 410 of the BRITISH MEDICAL JOURNAL of August 14th last, appeared in the *Frankfurter Zeitschrift für Pathologie* (Wiesbaden, 1908, vol. ii, pp. 1-56; the publisher is J. F. Bergmann; the price is probably M. 1½ or M. 2). So far as we are aware, the work has not been translated into English.

OLD TUBERCULOUS SINUS.

DR. F. BUTCHER (Medical Officer, Fife and Kinross Asylum) writes in reply to "Sinus" to advise that the patient should be kept in bed and liniment of iodine applied on an aseptic wooden probe. Silver nitrate solution applied in the same way is also useful.

DR. JOS. S. BOLTON (Nottingham) writes, in reply to "Sinus," to recommend the use of *x* rays in the treatment of the tuberculous sinus described.

DR. WILLIAM HAIG, M.B., C.M. (Gavelmore, Crieff), writes, in reply to "Sinus," August 28th, p. 500: I had a similar case eleven years ago. An otherwise healthy girl had a sinus leading from the outer side of her left leg in among the muscles of the calf for about three inches, and I could not get it to heal. Coming to the conclusion that the sinus was simply a passage between the layers of muscle, and that the movements of the muscles were keeping it from healing, I applied pressure by means of a pad of cotton-wool bandaged firmly over the part to obliterate the sinus, and moulded a splint of strong millboard to the foot and leg to keep the muscles at rest. In a short time the wound was quite healed and has never given the slightest trouble since.

THE BRITISH MOSQUITO.

"BITTEN."—The insects sent are the common English mosquito—*Culex pipiens*. They bite quite readily if the weather is warm, as was the case recently. The term "gnat" is an English word, which includes mosquitos and some non-biting insects with or without a distinct proboscis. The symptoms described by our correspondent as occurring after a bite on the wrist—acute erythema and oedema extending above the elbow, with fever and general malaise—were in all probability septic, a not uncommon sequence, the proboscis of the mosquito acting simply as the vector of the germ. The mosquito passes a stage of its life-history in water—for example, breeds in water. If all water receptacles are covered in or if all receptacles for standing water are abolished, *Culex* will cease to trouble. If the water-butts or other collections of water in ground round the house are examined, many little wriggling things, the larvae of the mosquito, will probably be seen swimming about. A little kerosene poured on the water will kill them by preventing their breathing. If these measures are effectually carried out they will succeed, but further precautions are: Do not sit in a garden at dusk or just as the sun sets; eucalyptus oil smeared on the face and hands will keep off mosquitos, but it is objectionable to many people. If the mosquitos are very bad at night, the patient should sleep in a mosquito net. Ammonia applied immediately after the bite is soothing. Carbolic acid solution, 1 in 20, is the best thing for the inflammation, and also is good for fresh bites. A septic arm as described would probably best be treated by 1 in 40 carbolic fomentations.

LETTERS, NOTES, ETC.

CONTINUOUS PROCTOCLYSIS.

DR. ALEXANDER DUKE (London, W.) writes: Having read with much interest Dr. Herbert Paterson's description of his appliance for the continuous administration of saline fluid per rectum, I was reminded that several years ago I had suggested a similar plan for continuous feeding per rectum, by a receptacle hung at a suitable height over the patient's head, and I designed a special nozzle in order to prevent the escape of the fluid from the bowel. The nozzle is kept in position by an elastic band passing between the patient's thighs, the ends fastened to a strap or bandage round the waist; the required tension can be easily found before the nozzle is introduced, and will, if properly adjusted, absolutely prevent the escape of fluid, and I venture to think, should be suitable for Dr. Paterson's appliance, as he only states "three feet of rubber tubing connected with large rectal tube." Will such a tube be tolerated by all patients, and will no fluid escape?

SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

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Eight lines and under	0	4	0
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An average line contains six words.

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NOTE.—It is against the rules of the Post Office to receive *Poste Restante* letters addressed either in initials or numbers.